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ROYAL BOTANIC GARDENS, KEW

XXIII—A CONTRIBUTION TO THE BOTANY OF ATHOS PENINSULA.

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Preface.

The Mount Athos Peninsula in the spring, as I have described elsewhere,* is a unique botanical paradise in an almost primitive condition, thanks to the lack of grazing animals.

Judas trees in full flower amongst the grey-green Olives; the Chermes Oak, its young foliage forming brilliant patches of scarlet or golden-bronze; here and there the pale apple-green of the leaves of the Manna Ash, crowned with panicles of white flowers, together with bushes of golden-yellow *Calycotome* made a picture the like of which, I fancy, can be seen nowhere else.

To be a Botanist on the Holy Mountain was not regarded by the Monks as an unusual occupation, for at Karyes there is an official Botanist Monk, who occupies his time in searching for plants of real or supposed medicinal importance. He quickly discovered us and came to call at Pyrgos soon after our arrival—possibly to see that we were not trespassing on his preserves. When he saw the sort of things we were collecting, I fancy his estimation of us was very much lowered and he regarded us as quite harmless.

He was a remarkable old Monk with an extensive knowledge of plants and their properties. Though fully gowned in a long black cassock he travelled very quickly, usually on foot and sometimes on a mule, carrying his "Flora" with him in a large, black, bulky bag. Such a bag was necessary since his "Flora" was nothing less than four manuscript folio volumes of Dioscorides, which apparently he himself had copied out. This Flora he invariably used for determining any plant which he could not name at sight, and he could find his way in his books and identify his plants—to his own satisfaction—with remarkable rapidity.

Sibthorp, it will be remembered, made his important journeys to the nearer East and to Athos with the object of identifying the plants recorded by Dioscorides.

When we met the Herbalist Monk at Pyrgos and later at Chilandari, he was busy collecting *Hyoscyamus* and Liquorice—a piece of the root of the latter he insisted on our chewing, an experience not to be repeated. Monks in other monasteries were also interested in plants, as for instance the "Druggist" Monk in the delightful little

* "A Botanist on the Holy Mountain." Blackwood's Magazine, 1934: (i) July, p. 81; (ii) November, p. 649.

pharmacy at Xenophontos with its array of antique earthenware drug pots, or the Monk at Iviron who gave us a bright-yellow, refreshing "tisane," an infusion of the leaves of *Salvia triloba* which he was cultivating in his garden.

A few plants were noted as being worthy of introduction to English gardens, more especially *Malcomia flexuosa*, *Matthiola sinuata* var. *glandulosa*, with very sweet-scented lilac flowers and grey foliage. *Viola alba* var. *violacea*, and *V. athois*, *Linum elegans*, *Myosotis cadmea* with flowers as fine as those of *Eritrichium*, and *Verbascum banaticum*. The *Verbascum* and the *Matthiola* have been grown successfully both at Kew and in the south and south-west of England, thanks to the sending of seed by Mr. Loch, and have also ripened seed over here. The Mullein with its 6–8-feet high candelabras of pale yellow flowers is of further interest since the plant is used for stupefying fish. The stems and leaves are boiled in water to extract the juices, and stones attached to ropes are then placed in the boiling liquid and taken to the fishing grounds and placed in the water. After some two hours the fish rise and are easily caught. When we first heard of this plant under the name Flomas (φλόμος) we were rather puzzled as to its identity, but on turning up Dioscorides we found he applies this name to Mulleins in general.

Among other plants of interest we noticed may be mentioned *Lilium candidum*, apparently quite free from disease, while the single Stocks on the monastery walls on the east side of the Peninsula in their many different colours made an unforgettable picture against the grey walls and rocks, only excelled by the beauty of Wistarias in full flower trailing along the balconies of the monasteries.

ARTHUR W. HILL.

INTRODUCTION.

The present paper is based mainly on the collection of plants made during a stay in Athos Peninsula in April 1934. I shall always remain deeply indebted to the Director for making arrangements for me to accompany him to this unique area, and to him and my Herbarium colleague, N. Y. Sandwith, for the great share they took in helping to make the valuable collection which is now incorporated in the Herbarium at Kew. Our thanks are due to Mr. H. G. Chick, C.I.E., C.B.E., formerly Consul-General at Salonika, for assistance in the arrangements to reach and stay on Athos Peninsula and for a considerable number of botanical specimens ; to Mr. and Mrs. Sidney Loch for their great kindness and hospitality to us during the time we made our headquarters at Pyrgos ; to Mr. Loch for accompanying us on our tours through the Holy Mountain ; to Mrs. Loch for botanical specimens and seeds for cultivation collected by her later in the season ; and to Mr. H. G. Tedd of Xanthi, for valuable collections from Athos Peninsula and Athos Peak, made in the summer and early autumn of 1934.

The plants considered in this paper include the collection made by us in April 1934 on Athos Peninsula and the Mulyani Islands, excepting the rather large number of Bryophyta, which are reserved for separate treatment, and plants from Athos Peninsula received from Mr. Chick, Mrs. Loch, and Mr. Tedd during 1934. In addition a number of plants collected by us in the neighbourhood of Salonika and on the Chalkidike Peninsula are included, together with some collected by Chick and Tedd on the Longos (Sithonia) Peninsula.

It was thought advisable to give some account of the physiography and geology of Athos Peninsula, to discuss the vegetation and the geographical distribution of the species, and to outline the history of previous botanical exploration of the area. The figures obtained by the analysis and summation of the geographical distributions of the species include only plants from Athos Peninsula, south-east of Xerxes Canal, and enumerated in the list.

We thank the following for help in the identification of special groups: F. Ballard, B. L. Burtt, C. E. Hubbard, H. W. Pugsley, and V. S. Summerhayes.

Physiography.

The peninsula of Chalkidike is shaped something like the back of a three-fingered hand stretching out into the Aegean Sea. The wrist is the northern depression, containing Lakes Beshik and Langaza, cutting it off from the mainland of Macedonia. The knuckles are the mountain ranges which cross the main body of the peninsula from E. to W. The three fingers are, from west to east, the promontories of Cassandra, Longos, and Athos(1)*. This modified quotation accurately describes the appearance and relative position of Athos Peninsula as seen on a map. The geographical relationships are fundamental in any consideration of botanical history and the following data are particularly important.

The Aegean Sea is approximately 600 km. long, due north and south from the southern coast of Thrace to the northern coast of Crete, and 300 km. broad at the latitude of the southern point of Athos Peninsula (40° 6′ N.), due east and west from the western coast of the Gallipoli Peninsula to the coast of Thessaly. It is an island-filled sea of geologically recent origin in its present form. Distances from the nearest point of the southern part of Athos Peninsula to the following islands and areas of the mainland indicate its fairly central position in the northern part of the Aegean; from Thasos 50 km., from Lemnos 60 km., from Samothrace 100 km., from Imbros 110 km., from Thessaly 130 km., from the Gallipoli Peninsula 160 km. The length of Athos Peninsula, from Xerxes Canal to the extreme south-eastern point along the main ridge, but not allowing for slopes, is 50 km. (nearly 30 miles). Its breadth varies from 2·3 to 8·8 km., excluding the extension of Cape Platy.

For the purposes of this paper Athos Peninsula is considered as commencing at the Xerxes Canal, thus including a north-western

* For literature see p. 203.

extension beyond the low and much broken wall which marks the land boundary of the Holy Territory or Holy Mountain (Hagion Oros). The area between the canal and the wall is now occupied by Greek refugees, or utilized by them for grazing, wood-cutting, etc., from Turkey (Constantinople and Caesarea) and inhabiting the village of Pyrgos. The inclusion of this area is justified by the very natural and well marked boundary which the Xerxes Canal makes, both topographically and geologically, and for the sake of comparisons which can be drawn between areas whose natural vegetation is in process of destruction and those whose primitive plant covering remains untouched or little modified by man and his flocks and herds. An account of the isthmus and of the canal has been published by Spratt (14).

The lowest part of Athos Peninsula is at its north-western end by the Xerxes Canal, where the greatest height is said to be only about 40 m. above sea level (2). From this low altitude there is a gradual rise to the main ridge which runs the length of the Peninsula, and reaches heights of 490 m., 520 m., 670 m., 765 m., and 991 m., before culminating in the steep-sided peak of Mt. Athos with an altitude of 1935 m. The ridge does not rise absolutely regularly but the peaks whose heights have just been given are separated by valleys or plateaus, or small intramontane basins. A considerable number of small, for the most part very small, streams drain to the sea from both sides of the ridge. These may be raging torrents after heavy rain or snow-melting, but for the greater part of the year their beds have little or no flowing water. Nevertheless Athos Peninsula is well-watered by numerous perennial springs, and the water-supply is naturally conserved by the forest covering. The hard, largely impenetrable and little jointed rocks do not cause water to drain away to great depths as in limestone areas of similar latitudes, and there is little or no trace of karst formation. Drought, even seasonal summer drought, is a factor of only local or temporary importance to the climax vegetation.

Geology.

The Aegean Sea is geologically of very recent formation (3, ch. II). Suess says man may have witnessed its formation, and Walther (4), referring to Seidlitz (5), says " die inselreiche Ägäis hat sich im Diluvium eingesenkt oder durch Ansteigen des Meeresspiegels angegliedert." This youthfulness of the present configuration of the coastal outlines of the northern parts of the Aegean Sea is in striking contrast to the age of the continental blocks to the north and east. The Rodope Massif and parts of western Asia Minor have not been submerged by any of the transgressions of the sea in Tertiary times; they have in fact been land areas, even if possessing extensive freshwater lakes, throughout the geological periods which it is necessary to consider in attempting to trace the history of the phanerogamic flora of the Balkan Peninsula. Athos Peninsula is

geologically a continuation of the Rodope Massif owing its survival to faulting on both sides, and cut off from the main mass of old rocks, extending northwards through the eastern and central parts of the Chalkidike Peninsula, by the relatively shallow Tertiary deposits in the neighbourhood of the Xerxes Canal, and on which Erissos (the ancient Acanthus) is built. These deposits have been variously described as of Sarmatic (Upper Miocene) or Pontic (Lower Pliocene) age and similar deposits separate the gneissic mass of Longos (Sithonia) from the mainland and occupy a much more extensive area in the western parts of Chalkidike, up to the neighbourhood of Salonika. They lie unconformably on the old rocks. The Sarmatic and Pontic waters were much more extensive and important far to the north of our area in which they probably represented inland brackish or freshwater lakes, or arms of such, or more rarely of sea. There is still considerable divergence of geological opinion on the history of the northern Aegean. Cvijić (11) postulates a very extensive Aegean Lake in Pontic times. According to his map, this covered the whole of Chalkidike, except Hortiach and a portion of the centre, and also Kassandra, Longos, and the whole of the Athos Peninsula except the Peak. The evidence, as set out by Cvijić, seems to the writer quite insufficient to support the hypothesis of the late Tertiary occurrence of such a large continuous sheet of water over the North Aegean and its neighbouring lands. We saw no evidence for it on Athos Peninsula apart from the very limited deposits near the Xerxes Canal. Philippson (13, pp. 82–91) has also very adversely criticized Cvijić's data and conclusions and shows that his Aegean lake terraces, if indeed they be such, are probably of more isolated local occurrence than stated by Cvijić, occur at different altitudes, are not always horizontal, and are often at much lower altitudes than those given by Cvijić. That lakes were much more numerous and much larger in Pontic times in Macedonia and neighbouring territories must be admitted, that there was an extensive continuous lake, of inland sea size, is extremely doubtful.

Research more recently published than Cvijić's records the occurrence of marine Sarmatic beds at the Gulf of Orfano (12). These, however, are apparently of limited extension westwards and even if they represent a considerable enlargement of the area known to have been covered by Sarmatic salt waters in the Aegean area, probably represent a temporary break into the land of the Aegean continent, and, with our present knowledge, scarcely justify Wurm's statement: "durch den Nachweis so junger neogener Meeresablagerungen wird der grosse ägäische Kontinente Neumayers wenigstens in seiner nördlichen Ausdehnung erheblich eingeschränkt."

Athos Peninsula south-east of Xerxes Canal is tectonically a great weathered down anticline, with its centre near Karyes (6). There occur more or less alternating outcrops, varying in width, of chlorite-schists, gneiss, mica-schists, and marble. The strike of the beds is approximately transverse to the long axis of the Peninsula,

and they dip away on both sides, to the N.W. and S.E. respectively, from the anticlinal centre near Karyes. Athos Peak is built up mainly of a grey-white crystalline limestone or marble, as it is often called. A similar marble is found, with narrower outcrop, near Chilandari on the other slope of the anticline. Exposures of conglomerate are also recorded by Grisebach (8) and Viquesnel (9). Metamorphic similar rocks to those of Athos Peninsula form the main mass of Chalkidike. Longos (Sithonia) is composed exclusively of grey gneiss, while Kassandra is entirely overlaid by Neogene (Young Tertiary, probably Pontic) deposits (6). In addition to the main anticline of Athos Peninsula, other, subsidiary, folds are discernible, especially to the north-west and south-east. The Peninsula is steeply faulted on both sides approximately parallel to its long axis (see maps in 2, 7, and 10). This faulting was no doubt contemporaneous with the foundering of the Aegean continent to form the Aegean Sea and was accompanied by other relative movements, up and down, of land and water. " The forming of the Aegean Sea and the joining of the Mediterranean and Black Seas by the old river-valley of the Bosporus and Dardanelles altered the drainage system of the Balkan Peninsula and was a cause, together with the other tectonic movements, of the ' young ' topography of many areas around the Aegean Sea " (3, p. 23). The apparently " young " topography superimposed on an old land surface can be well seen in many parts of Athos Peninsula, as in other areas of South Macedonia. Steep cliffs, high-angled slopes, narrow torrent-beds, masses of fallen rock debris, and the irregular sharp contouring of the Peak district, show that much weathering has yet to be done before a relatively stable equilibrium is reached.

Earthquakes are of common occurrence on Athos Peninsula and in neighbouring areas. The great earthquake of 26 September, 1932, did much damage in the Chalkidike and the northern parts of Athos Peninsula. The raw, almost bare, cliff above the sea-cliffs at the southern promontory of the Peninsula is said to have been formed by a great mass of rock falling into the sea when Athos was shaken by a terrible earthquake in 1905 (15, p. 92). In 1934 this great scar certainly looked younger than nearly 30 years ; but it may be that scree still falls at intervals and prevents the natural primary succession which one would expect to be showing there.

No signs of soil acidity were noticed anywhere on Athos Peninsula, except perhaps the very local occurrence of *Polytrichum*. Two samples of soil were collected as likely to show extreme pH range, dried, and tested colorimetrically on return to Kew. The first was collected on the eastern side of the Peak, high above Lavra, at about 800 m., in the marble rock district. This is a deep dull red soil which gave strong bubbling reaction with HCl. Its pH was approximately 8·0. The second soil was collected amongst *Cistus* macchia on the hills behind Pyrgos. It is, in the dry condition,

a light grey-brown soil, derived from granite-like schists. It produced no bubbling on application of HCl, but gave a pH of approximately 7·5.

Climate.

I have failed to find any published tables of temperature, rainfall, etc., for Athos Peninsula. My thanks are due to Dr. C. E. P. Brooks of the Air Ministry for his assistance in attempting to trace any published accounts.

The peculiar position, physiography, and altitudinal range of Athos Peninsula makes it impossible to be satisfied with records for such neighbouring stations as Salonika and Kavalla. One has perforce to be content with a few general and rather vague statements. The Peninsula has essentially a Mediterranean type of climate, with the maximum rainfall in the winter half of the year, relatively dry summers, and mild winters in the lower zones. On the ridge and peak these features are considerably modified by altitude. In April, snow was still present in considerable patches on the slopes of the peak, at about half-way up the eastern side of the peak deciduous trees had not or had scarcely burst their winter buds and the growth and flowering of the herbaceous vegetation had not commenced, except for a few very early spring plants. Heavy snow is said to be rare in the lower zones in winter, but it has been recorded (15, p. 142). Considerable floods from the slopes of the peak and of the ridge are not infrequent at the time of snow-melting on the highlands.

Literature Quoted.

(1) "A Handbook of Macedonia and Surrounding Territories." London, H.M. Stationery Office, n.d.

(2) Ogilvie, A. G. "A contribution to the Geography of Macedonia," in *Geogr. Journ.* **55,** 1 (1920).

(3) Turrill, W. B. "The Plant-Life of the Balkan Peninsula," Oxford, 1929.

(4) Walther, J. "Mediterranis," in *Peterm. Mitt.* Ergänzungsheft Nr. 225 (1936).

(5) Seidlitz, W. v. "Der Einbruch der Ägäis," in *Jenaische Zschr. f. Naturwiss.* **64,** Sitzungsber. 29 Juni, 1928, 20 (1929).

(6) Neumayr, M. "Geologische Untersuchungen über den nördlichen und östlichen Theil der Halbinsel Chalkidike," in *Denkschr. K. Akad. Wiss. Math.-Naturw. Cl.* **40,** 328 (1880).

(7) Bittner, A., M. Neumayr, und Fr. Teller. "Überblick über die geologischen Verhältnisse eines Theiles der Ägäischen Küstenländer," *l.c.* 387 (1880).

(8) Grisebach, A. "Reise durch Rumelien und nach Brussa," **1,** Göttingen, 1841.

(9) Viquesnel. "Journal d'un voyage dans la Turquie d'Europe," in *Mém. soc. geolog. de France,* sér. 2, **1,** pt. 1, 257 (1844).

(10) Maull, O. "Griechisches Mittelmeergebiet," Breslau 1922.
(11) Cvijić, J. "L'ancien lac Égéen," in *Anns. de Geogr.* **20,** 233 (1911).
(12) Wurm, W. "Oststruma-Gebiet," in *Die Kriegsschauplätze 1914–1918 geologisch dargestellt*, Heft 13, p. 71 (1925).
(13) Philippson, A. "Beiträge zur Morphologie Griechenlands," in *Geogr. Abhandl.*, Heft 3 (1930).
(14) Spratt, T., Remarks on the Isthmus of Mount Athos, in *Journ. Roy. Geogr. Soc.* **17,** 145 (1847).
(15) Dawkins, R. M. "The Monks of Athos." London, 1936.

History of Botanical Exploration.

The earliest scientific records of vegetation on Athos Peninsula which have been traced are those of **Belon** ("Observations de plusieurs singularitez mémorables, trouvées en Grèce, etc." Paris, 1554). The following extract from Grisebach, Spic. **1,** p. viii. (1843), is worth quoting: "Belon promus plagae orientalis indagator, a 1546 Thessalonica Byzantium conversus, Chalcidicen, peninsulam Hajion-Oros, ovam thracicam et Chersonesum peragravit et fragmenta quaedam botanica praecique de arboribus montis Athûs insulaeque Tassos tradidit."

The post-Linnean botanical history of Athos Peninsula apparently commences with the visit of **Sibthorp** in August 1787. In 1794, during his second journey to the Nearer East (1794-5), Sibthorp and his party appear to have spent a considerable period on Athos "where they were delayed for some time by Barbary pirates cruising in the neighbourhood" (Dict. Nat. Biog. **52,** 189: 1897). This delay may account for the relatively very thorough botanical exploration Sibthorp must have made, judging from his collections. Unfortunately no complete account of Sibthorp's travels has appeared. Extracts from his diary were published in Walpole's "Memoirs" (ed. 2, London, 1818), but without reference to his sojourn on Athos. Webber Smith, in a paper "On Mount Athos and its Monasteries," in Journ. Roy. Geogr. Soc. **7,** 61 (1837), gives a reference to Walpole's "Continuation of Memoirs," etc. p. 40, and says "I do not find any account recorded of English travellers having ascended to the summit of Athos since Dr. Sibthorp and Mr. Hawkins on the 12th of August, 1787, now nearly half a century ago, whose brief but excellent account of the ascent is comprised in a few lines." In the "Flora Graeca" (1806–40) and in the "Florae Graecae Prodromus" (1806, 1813) Sibthorp's Athos plants are listed, described, and, in the Flora, many of them figured. There is unpublished manuscript of Sibthorp's at Oxford and amongst this there may be some account of Athos Peninsula and its vegetation. Sibthorp's herbarium and the original paintings of the Flora Graeca are in the Department of Botany of the University of Oxford. A few of Sibthorp's plants are at Kew and an account of these has been published in Kew Bull. 1926, 120.

Friedrichsthal accompanied Boué on his Turkish journeys in 1836 (see Boué : La Turquie d'Europe, **1,** p. ix : 1840). Boissier, Flor. Or. **1**, p. xv. (1867) gives the dates as 1838 and 1839. A letter from Friedrichsthal published in Flora, **19,** 1, 221 (1836) gives the proposed route of his journey, which included Athos. Specimens collected by him on " Hajion-Oros " are quoted by Grisebach (e.g. Spic. **1,** 11, 26, 222 : 1843). Boué, l.c. 437, gives a " Catalogue d'une partie des plantes de la Turquie d'Europe," with many references to " mont Athos." This " Catalogue " is, however, a mere compilation, with the records for Athos extracted from Sibthorp's works, as indicated by the letter S.

Frivaldsky also must have visited or obtained specimens from Athos Peninsula previous to 1843 (? about 1834–36), if Grisebach be right in quoting him, as, e.g. in Spic. **1,** 26 (1843) under *Trifolium medium* L., and l.c. 171, under *Silene inflata* Sm. var. *athoa*. I have, however, failed to satisfy myself on this.

Aucher-Eloy visited Athos Peninsula in 1836 (Boiss. Flor. Or. **1,** p. xv : 1867). His plants were enumerated by Boissier in a series of papers commencing in Anns. Sci. Nat. IIe. Sér. **16,** 347 (1841) and in the Flora Orientalis (1867–84, Suppl. 1888).

Grisebach was on Athos Peninsula in 1839. He certainly made the most of the 10 days he spent here (4–13 June) as is shown by the long and valuable account he gives of the vegetation, etc. in his " Reise durch Rumelien und nach Brussa " **1,** 227 seq. (1841), and by the number of plants he collected and afterwards described in his " Spicilegium Florae rumelicae et bithynicae," 1843, 1844.

Tozer was on Athos Peninsula at least twice (June 1853 and August 1861). He makes many references to the vegetation in his book The Highlands of Turkey, **1,** chapters 3–5 (1869). Some of his dried plants are at Kew, and an account of these has been published in Kew Bull. 1920, 29.

Orphanides collected on Athos Peninsula in 1862. Many of his plants are recorded in Boissier's Flora Orientalis. The *Leguminosae* of his herbarium at Athens were listed by Heldreich in a publication entitled " Catalogus Systematicus Herbarii Theodori G. Orphanidis," Florentiae, 1877.

Janka sailed from Kavalla and landed at Pantokratoros on 20 July 1871. In a letter published in Oesterr. Bot. Zeitschr. **21,** 249 (1871) he gives an interesting and amusing account of his experiences and more important botanical finds. He was on the peninsula till near the end of July and climbed the peak twice.

Pichler collected on Athos in 1873 (July), judging from labels in Herb. Kew., but no published account of his visit has been traced.

Celakovský, during the years 1884 and 1885, received from a Bohemian monk, domiciled in the monastery of Chilandari, a considerable number (about 150) of dried specimens, mainly, but not entirely, from the district round Chilandari. The monk's

name is given as Slavilor Breuer, which he changed to Sava (Sava Chilandarac) on taking the monastic vows. A useful account of this collection was published by Celakovský in Sitz. kgl. böhm. Gesell. Wiss. Prag, 1887, 528. A later collection made by Sava, mostly in 1896 and 1897, is listed by Tocl and Rohlena in Sitz. kgl. böhm. Gesell. Wiss. Prag, 1902 (article XLIX—separate with pp. 1–8).

Sintenis and Bornmüller (Iter Turcicum 1891) made considerable collections on Athos Peninsula. References to their journey will be found in Oesterr. Bot. Zeitschr. **41,** 218, 431 (1891).

Athos Peninsula was visited by **Formánek** in 1900. A list of his plants is included by C. Vandas in "Additamenta ad Floram Macedoniae et Thessaliae," in Mag. Bot. Lap. **4,** 262 (1905).

Adamović spent some days on Athos Peninsula in May, 1905, and "den Berg Athos (Hagion Oros) von zwei Seiten aus bestieg" (Oesterr. Bot. Zeitschr. **55,** 493 : 1905). It was on this journey that he discovered *Corydalis Wettsteinii,* which he described as a new species in Oesterr. Bot. Zeitschr. **56,** 174 (1906) with a photographic reproduction. Probably both the photograph and the description were made from material cultivated from plants collected in 1905.

Dimonie was apparently on Athos Peninsula in May 1909. Bornmüller, in Engl. Bot. Jahrb. **59,** 491 (1925) quotes a specimen from him under the name *Astragalus tymphresteus* Boiss. et Spr. Mihail Dimonie was resident in Salonika, according to Vierhapper in Oesterr. Bot. Zeitschr. **59,** 148 (1909).

Hartmann collected a small series of plants on Athos Peninsula in 1913 and 1914. These are included by Bornmüller in his Beiträge zur Flora Mazedoniens (in Engl. Bot. Jahrb. **59–61,** see l.c. **59,** 300 : 1925). Species collected by him on Athos Peninsula have been described as new by several authors (e.g. Beauverd in Bull. Soc. Bot. Genève, **6,** 153 : 1914 ; Hayek in Oesterr. Bot. Zeitschr. **64,** 359 : 1914).

Mattfeld visited Athos Peninsula in 1926, mainly in connection with his studies on the *Abies* of the Balkan Peninsula. He gives a valuable account of the Athos *Abies* in Bibl. Bot. Heft 100 (1930), including (Tafel II) some fine photographic reproductions of the woods.

Wagner, in Fedde Repert. **38,** 286/502–287/503 (1935) describes as new two species of *Centaurea* under the names *C. Huljakii* and *C. Sanctae-Annae.* The locality is given as "Athos circa 600 m." with no indication of collector or date, or type specimen.

Dawkins, during his visits to Athos Peninsula collected a number of plants which are now in the Kew Herbarium. They are referred to in his book "The Monks of Athos," London, 1936.

Grebenchikoff visited Athos Peninsula in August 1936, and made a valuable collection. A set of his plants is also at Kew.

The first impression, and a true one, which the botanist obtains on visiting Athos Peninsula is of the luxuriance and natural wildness of the vegetation over most of the area. This impression is the greater if he be already familiar with other districts of the Balkan Peninsula, or indeed, with other countries bordering the Mediterranean Basin. Grisebach (Reise, **1,** 245 : 1841), compared the thickness and fulness of the vegetation in the " Holy Wood " with descriptions of tropical vegetation. It soon becomes apparent that this luxuriance of macchie and forest is due to the absence of large herds and flocks of domesticated animals. That the climate and soil are suited to a dense growth of vegetation is, of course, true ; but Athos is not unique in the Balkan Peninsula in these environmental factors. One can in fact say that Athos Peninsula, south-east of the wall bounding the Holy Mountain, is a very typical and permanent area of " exclosure " to use Clements's term (Journ. Ecol. **22,** 43 : 1934). The laws of the monastic republic ordain that no female animals shall be allowed on the territory. This law is strictly kept so far as the domestic mammalian herbivorous fauna is concerned. There are numerous hares, and, according to information received locally, some wild deer and wild pigs in the forests. These, however, are insufficient to affect the vegetation to any appreciable extent. Mules are used for transport, but, except around some of the larger monasteries, are not turned loose for grazing, and then only within very limited areas. Gardens, olive-groves, and some meadow-land occur round the buildings, but by far the greater part of Athos is covered with natural vegetation. Much of this is primitive in the sense in which this word has been defined for woodlands (Moss, Rankin, and Tansley, in New Phyt. **9,** 113 : 1910). A certain amount of cutting of timber has probably taken place throughout historic times, but no planting. There are, indeed, considerable areas which, so far as can be judged from field observations, have never been exploited. Judicious cutting of tall trees probably does little or no harm to the natural vegetation. In the absence of flocks and herds rejuvenation occurs naturally and quickly. In other words a relatively short secondary succession speedily re-establishes the climax. On the other hand, the twenty monasteries own all the land, some of them are now very poor, sources of external income having been cut off entirely or much reduced since the world war, and timber is one of the chief potential sources of wealth for some of them. We gained the general impression that cutting had increased of late and that forests farther distant from the monasteries were being cut than was the former rule. A botanist can only express the fervent hope that exploitation will not increase to such a degree or in such a manner that rejuvenation cannot occur. If this were allowed not only would a botanically unique vegetation be destroyed but it would be a short-sighted economic policy for the monasteries, the monastic

republic, and for the Greek nation which holds the secular overlordship.

The chief features of the vegetation may be described on the basis of altitudinal zonation.

Sea and coast. The Aegean Sea, in common with other divisions of the Mediterranean has very weak tides. As a consequence special coastal communities are little developed and there are no salt marshes, sand-dunes, or extensive shingle beaches. Often the rocks go down sheer into the sea. Where the sea-floor is not too deep and is sheltered extensive submarine meadows of *Posidonia oceanica* (L.) Del. occur, as around the Mulyani Islands and in the bay of Pyrgos. Sometimes, as near Pyrgos and also locally on the east coast, considerable quantities of broken leaves of this plant are cast up on shore by the waves in storms and dry a pale dirty straw colour. On the strand, which is usually narrow and covered with rocks and boulders, the scree of the cliffs and slopes, more rarely sandy or with water-worn pebbles, characteristic plants are: *Silene Fabaria* S. et S., *Glaucium flavum* Crantz [± var. *leiocarpum* (Boiss.) Stoy, et Stef.], *Medicago marina* L., *Armeria sancta* Janka, *Limonium angustifolium* (Tsch.) Turrill, *L. Gmelinii* (Willd.) O. Ktze., *L. sinuatum* (L.) Mill., *Calystegia Soldanella* (L.) R. Br. *Diotis maritima* Cass., *Eryngium maritimum* L., *Andryala dentata* S. et S., *Cynodon Dactylon* (L.) Pers., *Euphorbia Paralias* L., *Crithmum maritimum* L., *Spergularia rubra* (L.) Pers., *S. salina* J. et C. Presl, and *Cakile maritima* Scop.

Streams. In the valleys of streams near their junction with the sea, boulder-strewn beds of greater or less width are formed when the stream is in flood. The sides, and sometimes parts of the flood-bed, frequently have groves of plane, alder, willows (*Salix alba* L.), and *Tamarix tetrandra* Pall. A good example occurs near Chilandari arsenal. In April the planes had considerable quantities of the previous year's fruits, the seeds from samples of which germinated readily at Kew, with practically 100 per cent. germination. Other plants characteristic of stream beds and stream-sides are *Nerium oleander* L. and *Vitex Agnus-castus* L.

Aquatic and marsh plants. Habitats suitable for aquatic and marsh plants are of very local development and of small area. The most extensive water and wet areas are along the old line of Xerxes Canal, but smaller damp and at least semi-marsh areas occur on the plateau between (and above) Chilandari and the boundary wall, and elsewhere in the deciduous woods where springs outcrop. The ponds along the line of Xerxes Canal were in April white with flowering batrachian buttercups (*Ranunculus peltatus* Schrk. and *R. paucistamineus* Tsch.). The swamps linking up the open water ponds contained *Heleocharis palustris* (L.) R. Br., *Juncus bufonius* L., and *Ranunculus ophioglossifolius* Vill., and were bordered by abundant fully flowering *R. sardous* Cr. In other wet or damp spots on the Peninsula we found: *Nasturtium officinale* R. Br.,

1. Partly denuded hill-slopes behind Simopetra Monastery, with Athos Peak in the background.

2. Dense macchie on hill-slopes. Young plane trees in stream bed. Near Zographu.

Photos by N. Y. Sandwith.

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Montia verna Neck., *Carex distans* L., *C. divisa* Huds. var. *chaetophylla* (Steud.) Daneau, *Scirpus setaceus* (L.) Palla, *Arundo Donax* L., and, on a damp wall, *Saxifraga hederacea* L.

Macchie. The lower zones of the whole Peninsula are covered with macchie. That these largely sclerophyllous and evergreen brushwoods would repay very careful and detailed ecological study was evident from our observations. We, however, were on Athos Peninsula only for a relatively short period and at one season of the year. The following notes are therefore very incomplete but may serve to stimulate some ecologist with time available to undertake a thorough study. Four important facts may be mentioned : the considerable floristic richness of the macchie ; the great variation in qualitative and quantitative composition in different parts ; the comparatively large numbers of deciduous bushes and small trees in some macchie ; and the great wealth of colour in April. These features were quickly apparent to one who knows macchie in other parts of the Balkan Peninsula.

The components of the high macchia (which can probably be further subdivided) may conveniently be divided into evergreen (sclerophyllous) and deciduous types. Of the former the following are especially characteristic : *Pinus halepensis* Mill., *Arbutus Andrachne* L., *A. Unedo* L., *Myrtus communis* L., *Olea europaea* L. subsp. *oleaster* (Hoffm. et Lk.) Fiori, *Laurus nobilis* L., *Quercus Ilex* L., *Smilax aspera* L. and its var. *mauritanica* (Desf.)) Aschers. et Graebn., and *S. excelsa* L. Deciduous species include : *Cercis siliquastrum* L., *Coronilla emeroides* Boiss. et Sprun., *Crataegus monogyna* Jacq. (local), *Sorbus torminalis* (L.) Cr. (local), and *Fraxinus Ornus* L., with the climber *Tamus communis* L. var. *cretica* (L.) Boiss.

Lower macchie, from which the taller trees have probably been cut out for timber, contain as evergreen members *Cistus monspeliensis* L., *C. salviifolius* L., *C. villosus* L. subsp. *creticus* Hayek, *Rhamnus Alaternus* L., *Calycotome villosa* (Poir.) Lk., *Spartium junceum* L., *Erica arborea* L., *E. verticillata* Forsk., *Phillyrea media* L., *Osyris alba* L., *Quercus coccifera* L., and *Juniperus Oxycedrus* L. ; and as deciduous members (? all completely deciduous) *Euphorbia acanthothamnos* Heldr. et Sart., *E. dendroides* L., and *Pistacia Terebinthus* L. At the higher boundary of the macchie *Quercus lanuginosa* (Lam.) Thuill. is to be found.

The occurrence and degree of dominance shown by *Pinus halepensis* Mill. varies greatly. Some macchie have *P. halepensis* in open or more or less closed canopy with dense macchie undergrowths. It must be remembered that *P. halepensis* is a tree with a relatively light canopy, casting much less shade than many other species of pine. An interesting community occupies a considerable area of the plateau above Chilandari in the direction of Pyrgos. Here high, but sometimes rather open, forest of *P. halepensis*, with a certain amount of *P. Pinea* L., has a thick undergrowth sometimes dominated by *Erica arborea* L. in an almost pure

community, or this mixed with *E. verticillata* Forsk. and *Arbutus Unedo* L. as co-dominants. A few bushes of *Calycotome villosa* (Poir.) Lk. and a species of *Pyrus* were noticed in other parts of the forest.

At the edges of the macchie, in open spaces between the trees and shrubs, and on the sides of paths through the macchie zone, a wealth of flowering herbaceous plants were at their best in April. Floristically, from the number of species in flower, this is the best spring collecting ground on Athos Peninsula. A considerable number of the plants belong to typical and widely distributed Mediterranean species, but some are of more local occurrence. Most of the species considered in this paragraph are light-demanding plants which cannot flourish in the dense macchie. The almost complete absence of grazing animals enables them to reach their maximum luxuriance. The following list, though not complete, indicates the floristic and ecological types which occur most commonly: *Anemone hortensis* L. var. *purpureo-violacea* (Boiss.), *Ranunculus rumelicus* Griseb., *Fumaria macrocarpa* Parl., *F. Thuretii* Boiss., *Alyssum umbellatum* Desv., *Aubrieta deltoidea* (L.) DC., *Biscutella ciliata* DC., *Brassica cretica* Lam., *Cardamine graeca* L., *Clypeola Jonthlaspi* L., *Crambe hispanica* L., *Lunaria annua* L. subsp. *pachyrhiza* (Borb.) Hayek, *Malcomia flexuosa* S. et S. (also on rocks near the sea), *Fumana thymifolia* (L.) Verl. var. *glutinosa* (L.) Burn., *Tuberaria guttata* (L.) Fourr., *Kohlrauschia velutina* (Guss.) Reichb., *Hypericum Montbretii* Spach, *Geranium purpureum* Vill., *Astragalus macedonicus* Heldr. et Nadji, *Cytisus hirsutus* L., *C. triflorus* L'Hér., *Hymenocarpus circinnatus* (L.) Savi., *Lathyrus digitatus* (M. Bieb.) Fiori, *Lupinus angustifolius* L., *L. Termis* Forsk., *Ornithopus compressus* L., *Pisum elatius* Stev., *Trifolium subterraneum* L., *T. uniflorum* L., *Vicia grandiflora* Scop. var. *Kitaibeliana* Koch, *V. villosa* Roth, *Cotyledon pendulinus* (DC.) Batt., *Sedum glaucum* W. et K. var. *Buxbaumii* (Griseb.) Hayek, *Rubia Olivieri* Rich., *Valeriana Dioscoridis* S. et S., *Valerianella carinata* Lois., *Bellis hybrida* Ten., *Calendula arvensis* L., *Crupina Crupinastrum* (Moris) Vis., *Jurinea mollis* (L.) Reichb., *Lagoseris sancta* (L.) K. Maly, *Leontodon tuberosus* L. var. *Oliveri* (DC).) Hayek, *Phagnalon graecum* Boiss. et Heldr., *Scorzonera mollis* M. Bieb., *Senecio lividus* L., *Tragopogon dubius* Scop., *Campanula lingulata* W. et K., *Alkanna graeca* Boiss. et Sprun., *Anchusa italica* Retz., *A. officinalis* L. var. *moesiaca* (Vel.) Guşul., *Cynoglossum creticum* Mill., *Convolvulus elegantissimus* Mill., *Scrophularia heterophylla* Willd., subsp. *laciniata* (W. et K.) Maire et Petitm. var *variegata* (Reichb.) Hayek, *S. peregrina* L., *Veronica Cymbalaria* Bod., *Orobanche Muteli* F. Schultz, *Ajuga chamaepitys* (L.) Schreb. var. *grandiflora* Vis., *Lamium garganicum* L. var. *glabratum* Griseb., *Salvia triloba* L. fil., *Stachys arvensis* L., *Thymus heterotrichus* Griseb., *Scleranthus dichotomus* Schur, *Aristolochia pallida* Willd., *Euphorbia dendroides* L., *E. oblongata* Griseb., *E. veneta* Willd., *Cephalanthera longifolia* (L.) Fritsch, *Orchis provincialis*

Balb., *O. quadripunctata* Cyr., *Serapias vomeracea* (Burm.) Briqu., *Iris Reichenbachii* Heuff., *Allium trifoliatum* Cyr., *Gagea amblyopetala* Boiss, et Heldr., *Ornithogalum tenuifolium* Guss., *Arisarum vulgare* Targ. Tozz., *Aira capillaris* Host.

The great earthquake scar near the point of Athos, between Kapsokalývia and Lavra, consists of cliffs, scree, and blocks of marble. There are, however, scattered plants which may be poineers of a new succession, though, if 1905 be the date of the main fall, it is probable that the scree has not yet attained full stability. Species found as scattered individuals or in small colonies on the scree include : *Linum angustifolium* Huds., *L. elegans* Sprun. (a very beautiful plant), *Onosma paradoxum* Janka, and *Bromus sterilis* L. Marginal to the scree or tending to spread into it there also occurred : *Smyrnium Orphanidis* Boiss., *Picris pauciflora* Willd., *Tyrimnus leucographus* (L.) Cass., *Cerinthe minor* L., *Orobanche lavandulacea* Reichb., *Scutellaria albida* L., *Euphorbia acanthothamnos* Heldr. et Sart., *E. dendroides* L., *Arum orientale* M. Bieb. subsp. *elongatum* (Stev.) Engl., and *Melica minuta* L.

In many parts of the Athos Peninsula, especially near the monasteries, on the north-western side, and above all between the boundary wall and Xerxes Canal the macchie have been considerably modified by cutting of the trees and larger shrubs and, in the last mentioned area, by grazing of sheep and goats owned by the refugee village of Pyrgos (Neo Prosforion). The stages of macchia degeneration under the destructive influence of man can be seen only too clearly in the north-west of the Peninsula. In the neighbourhood of the boundary wall a considerable amount of wood, largely for fuel, is undoubtedly poached, in addition to the cutting authorized by the monasteries. The depauperated macchie contain many of the low shrubs already mentioned, but are floristically much poorer and of much lower growth. There are more open spaces and, in the aggregate, considerable areas of ground bare of, or with a very shallow, soil. Excessive grazing results in extreme degeneration to phrygana, which may be termed a biotic proclimax. *Quercus coccifera* L., as a low prickly scrub, *Calycotome villosa* (Poir) Lk., *Phillyrea media* L., species of *Cistus*, and *Erica arborea* L., often form the main woody element. Where the deciduous *Paliurus spina-Christi* Mill. increases in number of individuals a transition to pseudo-macchia is noticed. Flat, extensively grazed areas, sometimes become thickets of *Asphodelus albus* Mill., as was seen on one of the Mulyani Islands. Near the Xerxes Canal a low phrygana was dominated by *Poterium spinosum* L. This was well within the grazing area of flocks and herds owned by the inhabitants of Erissos, indeed we saw large numbers of animals eating the poor forage provided by this plant community. Amongst the depauperated macchie, often protected by the prickly kermes oak where grazing animals occur, a considerable number of herbaceous plants contrive to exist or with the local exclusion of herbivores even to flourish.

Leguminosae are particularly abundant in some parts, and include : *Psoralea bituminosa* L., *Melilotus neapolitanus* Ten., and many clovers, including *Trifolium arvense* L., *T. campestre* Schreb., *T. glomeratum* L., *T. radiosum* Wahlenb., *T. scabrum* L., and *T. tomentosum* L. Other species occurring especially on hill-slopes with low or depauperated macchie are : *Silene Cucubalus* Wib., *Crucianella latifolia* L. var. *monspeliaca* (L.) DC., *Crepis neglecta* L., *C. pulchra* L., *Filago gallica* (L.) L., *Hedypnois rhagadioloides* (L.) Willd. subsp. *cretica* (L.) Hayek, *Pallenis spinosa* (L.) Cass., *Senecio vernalis* W. et K., *Taraxacum megalorrhizon* (Forsk.) Hand.-Mazz., *Zacintha verrucosa* Gaertn., *Bellardia Trixago* (L.) All., *Parentucellia latifolia* (L.) Cav., *Verbascum banaticum* Roth, *V. phoeniceum* L., *Orobanche caryophyllacea* Sm., *Salvia viridis* L., *Plantago Bellardi* All., *P. Lagopus* L., *Lagurus ovatus* L., and *Poa bulbosa* L.

Around some of the monasteries a few fields are kept as hay-meadows. One examined near Lavra had the following plants in flower : *Anemone hortensis* L. var. *purpureo-coerulea* (Boiss.), *Ranunculus eriophyllus* C. Koch, *Raphanus Raphanistrum* L., *Pisum elatius* Stev., *Vicia angustifolia* Reich., *Tordylium maximum* L., *Bellis hybrida* Ten., *Anthoxanthum odoratum* L., *Briza maxima* L., *Bromus maximus* Desf., *B. mollis* L. (s.l.), and *B. scoparius* Jusl. In a grassland area on the plateau above Chilandari the following grasses were in flower : *Anthoxanthum odoratum* L., *Bromus tectorum* L., *Holcus setiglumis* Boiss, et Reut., and *Hordeum leporinum* Link.

In cultivated arable fields in the Pyrgos and Erissos districts the following weeds were found : *Papaver hybridum* L., *Lepidium spinosum* Ard., *Silene gallica* L., *Lathyrus Aphaca* L., *Campanula phrygia* Jaub. et Spach, and *Legousia Speculum-Veneris* (L.) Fisch. In the fields of the Chalkidike Peninsula *Leontice Leontopetalum* L. was conspicuous in flower and fruit in April, but was not observed on Athos Peninsula. Around buildings *Hyoscyamus albus* L. was common. In waste places in the village of Pyrgos *Xanthium spinosum* L. and *Malva silvestris* L. were common, and *Heliotropium europaeum* L. and *H. suaveolens* M. Bieb. occurred amongst the stones of the main street.

On the walls of and around monastic buildings a number of interesting plants occur. Often the transition from rocks to walls can be traced, indicating rather clearly how plants can become semi-domesticated. Species found on walls include : *Fumaria capreolata* L. var. *albiflora* Hamm., *Sedum litoreum* Guss., *Galium murale* (L.) All., *Campanula Erinus* L., *C. rupestris* S. et S. subsp. *eu-rupestris* Hayek var. *Andrewsii* (DC.) Hayek, *Veronica arvensis* L., *Rosmarinus officinalis* L., *Sideritis romana* L., *Parietaria lusitanica* L., and *P. vulgaris* Hill.

The group of islands in the north-eastern part of the Gulf of Athos are termed the Mulyani Islands. Three or four of the smaller islands opposite Pyrgos were visited. The smaller islets have a

natural undamaged open vegetation, the larger ones are heavily grazed. Sandy beaches and rocky stony ground predominate. Modified, in the grazed islands depauperated, macchie cover much of the ground. Even on the smallest islets visited *Quercus coccifera* L., occurred with galls of the kermes insect. The following species found on the islands are worth mentioning : *Berteroa orbiculata* DC., *Malcomia flexuosa* S. et S., *Matthiola sinuata* (L.) R. Br. subsp. *glandulosa* (Vis.) Vierh., *Viola Kitaibeliana* R. et S., *Cerastium illyricum* Ard., *Holosteum umbellatum* L. var. *hirsutum* Turrill, *Polycarpon tetraphyllum* L. var. *diphyllum* (Cav.) DC., *Silene colorata*, Poir., *Biserrula pelecinus* L., *Ornithopus perpusillus* (Mill.) Druce, *Vicia dasycarpa* Ten., *Tillaea muscosa* L., *Anthemis tomentosa* L. subsp. *peregrina* (L.) Hayek, *Centaurea Grisebachii* Nym., *Sonchus, asper* (L.) Hill subsp. *glaucescens* (Jord.) Hayek, *Asterolinum linum-stellatum* (L.) Duby, *Herniaria hirsuta* L., *Euphorbia Peplis* L., *Muscari tenuiflorum* Tausch, *Avena barbata* Gott., *Catapodium loliaceum* (Huds.) Lk., *Lolium strictum* Presl, and *Ephedra campylopoda* C. A. Mey.

To sum up our observations on the macchia zone, it may be said that it is the zone *par excellence* of Mediterranean vegetation in Athos Peninsula. The very considerable number of species which occur is indicated by the lists given above. While in a short visit, covering a considerable distance, it was impossible to analyze the vegetation as it deserved, it was possible to note that different kinds of macchie occurred. Even amongst the tall, and often primitive, macchia types dominated by *Pinus halepensis* L. as a tree canopy, or by *Arbutus* spp., or by *Laurus nobilis* L., or by *Myrtus communis* L., differences in dominance were noticed in different parts of the Peninsula. These differences were certainly, at least in part, due to natural factors. While a macchia of mixed high growth can occur as undergrowth to *Pinus halepensis*, it can also occur in what appears to be a climax association so dense that seedlings of the light-demanding aleppo pine cannot establish themselves. The nature of the substratum and the speed with which the macchia shrubs " get away " are probably two of the factors determining the presence or absence of pine trees. The colour brilliance of the macchie (in the broad sense), especially on the west side of the Peninsula, in April was due to the large numbers of flowering shrubs and the masses of their flowers. Conspicuous from this standpoint were the deep lilac-purple of *Cercis* (much deeper in colour than any seen in cultivation in England), the gorse-yellow of *Calycotome villosa* (Poir) Link and *Coronilla emeroides* Boiss. et Sprun., and the white of *Fraxinus Ornus* L. and *Erica arborea* L. In addition the purple-red of the young shoots of *Quercus coccifera* L. and of the leaves and inflorescences of *Rhamnus Alaternus* L. and the often numerous and sometimes tall herbaceous plants in the less dense macchie added to the blaze of colour. The tall macchie, dominated by evergreen species (pines, strawberry-trees, laurel, myrtle, etc.)

were beautiful by contrast of their dark green restful foliage with the colour variation of the more open types.

Above the macchia zone a gradual transition to mixed or more or less alternating fir and deciduous woods occurs. Firs occur at as low an altitude as 3–400 m. and continue intermittently to the highest points of the main ridge, and other fir communities occur higher up on the Peak. *Viscum laxum* Boiss. et Reut. var. *Abietis* (Wiesb.) Hayek occurs as a parasite on the firs. Another ecological problem, of considerable interest, which can only be solved by detailed studies, is the relative distribution, and its underlying causes, of the fir and deciduous woods. One of the most marked consociations is that of the sweet chestnut (*Castanea sativa* Mill.). The trees are frequently pollarded in the more accessible woods and in April were leafless. The field layer of herbaceous plants in the *Castanea* woods had in flower in April: *Ranunculus Ficaria* L., *Corydalis Wettsteinii* Adamović, *Arabis Turrita* L., *Viola alba* Bess. subsp. *scotophylla* W. Becker var. *violacea* Wiesb., *V. Riviniana* Reichb., *Stellaria media* (L.) Vill., *Genista tinctoria* L., *Lathyrus venetus* (Mill.) Wohlf., *Vicia Barbazitae* Ten., *Saxifraga rotundifolia* L., *Cyclamen neapolitanum* Ten., *Myosotis cadmea* Boiss., *Symphytum bulbosum* Schimp., *Veronica Chamaedrys* L. var. *pilosa* (Schm.) Benth., *Lamium bifidum* Cyr., *Lamium striatum* S. et S. var. *glabratum* Griseb., *Rumex Acetosella* L., *Scilla bifolia* L., and *Luzula Forsteri* (Sm.) Lam. et DC. Some of these occurred also at lower altitudes. *Daphne Laureola* L. and *Ruscus Hypoglossum* L. were also frequent. Sometimes the woods were of a mixed association with firs and deciduous trees well scattered together. In such woods, in addition to *Castanea*, deciduous trees included oaks (in part *Quercus lanuginosa* (Lam.) Thuill.), lime (*Tilia* sp.), and poplar (*Populus nigra* L. var. *italica* Duroi). Undergrowth of holly or hazel was common, with, in places, a good deal of ivy or bracken. Hazel thickets are well developed round Karyes, and one derivation of the name of this, the administrative centre of the monastic republic, is from a Greek word for hazel. Other derivations are, however, accepted by some writers. A particularly interesting vegetation dominated by firs or by firs and mixed deciduous trees was visited on the east side of Athos peak. The transition from high macchia to fir wood was, along the path we took or made, unusually abrupt. The deciduous trees had, at about 800 m., for the most part not yet burst their buds, and this was also about the highest level of flowering for the early spring flower types in April. In addition to trees already mentioned *Acer platanoides* L. (just in flower), *Populus* sp. (*P. tremula* L. ?), and *Ostrya carpinifolia* Scop. Plants of the field layer found in flower—most of them only just coming into flower—were: *Alliaria officinalis* Andrz., *Alyssoides utriculatum* (L.) Med. var. *graecum* (Reut.) Hayek, *Cardamine hirsuta* L., *Hesperis glutinosa* Vis. var. *Visianii* (Fourn.) Hayek, *Isatis praecox* Kit., *Viola alba* Bess. subsp. *scotophylla* W. Becker var. *violacea* Wiesb., *Potentilla geoides* M. Bieb., *Euphorbia*

1. Macchia on hillslopes with most of the trees cut down. Near Zagraphia

2 Deciduous pollarded *Castanea* trees, below the ridge, not far from Karyes.
Photos by N. Y. Sandwith.

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amygdaloides L., *Galanthus nivalis*, L., *Fritillaria pontica* Wahlenb., and *Melica uniflora* Retz.

Grassy banks and slopes, well shaded and often damp occur not infrequently in the fir and deciduous tree zone. These were often gay with an early spring flora. Near Karyes, for example, on such a bank were noted in flower: *Arabidopsis Thaliana* (L.) Schur, *Arenaria serpyllifolia* L. var. *viscida* DC., *Cerastium brachypetalum* Desp. var. *eglandulosum* Fenzl., *C. glomeratum* Thuill., *Myosotis collina* Hoffm., *Symphytum ottomanum* Friv., *Lamium maculatum* L. var. *echinatum* Griseb., and *Fritillaria pontica* Wahlenb.

We did not climb to the top of Athos Peak, 1935 m. At about half-way up on the eastern slopes, it was obvious that flowering had hardly commenced in April. The Peak was, however, climbed by H. G. Tedd in July of the same year and his valuable collection is at Kew. The upper regions of the Peak have so many interesting plants that a list of some of them, from Tedd's collection, is given here: *Thalictrum minus* L. var. *olympicum* Boiss., *Isatis athoa* Boiss., *Helianthemum nitidum* Clem. var. *glabrum* (Koch), *Arenaria rotundifolia* M. Bieb. var. *pauciflora* Boiss., *Cerastium banaticum* (Roch.) Heuff., *Dianthus athous* Rech. fil., *Minuartia verna* (L.) Hiern subsp. *Gerardii* (Willd.) Graebn. var. *mediterranea* (Fzl.) Graebn., *Silene genistifolia* Hal., *Linum austriacum* L., *L. tenuifolium* L., *Anthyllis montana* L., *A. Vulneraria* L. subsp. *pulchella* (Vis.) Bornm., *Astragalus angustifolius* Lam. subsp. *pungens* (Willd.) Hayek, *A. parnassi* Boiss., *Saxifraga sancta* Griseb., *Sedum ochroleucum* Chaix, *Sempervivum marmoreum* Griseb., *Cnidium silaifolium* (Jacq.) Simk., *Pimpinella Tragium* Vill., *Asperula athoa* Boiss., *Galium asparagifolium* Boiss. et Heldr., *Pterocephalus perennis* (L.) Coult., *Scabiosa Webbiana* Don., *Anthemis Sibthorpii* Griseb., *Carduus armatus* Boiss. et Heldr., *Centaurea athoa* DC., *C. chalcidicaea* Hayek, *Helichrysum virgineum* (S. et S.) Boiss., *Campanula Orphanidea* Boiss., *C. rotundifolia* L. subsp. *sancta* Hayek, *Calamintha alpina* (L.) Lam. var. *granatensis* (Boiss. et Reut.) Hal., *Nepeta Sibthorpii* Benth., *Phlomis samia* L., *Teucrium montanum* L., *Thymus Jankae* Čel., *T. ocheus* Heldr. et Sart., *T. Tosevii*, Vel., *Daphne oleoides* Schreb. var. *glandulosa* (Bertol.) Keissl., *Agropyron sanctum* (Janka) Hack., *Bromus fibrosus* Hack., *Koeleria splendens* Presl, and *Poa alpina* L.

The zonation of the Peninsula and Peak is given at length by Grisebach (Reise **1**, 294 seq.: 1841). Mattfeld (Bibl. Bot. Heft 100, 32 seq.: 1930) discusses the distribution of the firs and fir-woods and corrects some of Grisebach's altitudinal measurements.

Cultivation on Athos Peninsula is limited to the fields and groves, recently considerably extended by refugee influx, around Pyrgos, to the north-west of the boundary wall of the Holy Mountain and between this and Xerzes Canal, and to limited areas around the monasteries, sketes, and other monastic buildings. Conspicuously associated with many of the monasteries are cypress trees [*Cupressus sempervirens*, L. var. *pyramidalis* (Targ. Tozz.) Nym.] and *Wistaria*.

Olive groves are not uncommon, but on the Holy Mountain are rarely extensive. Oranges, lemons, and quinces are cultivated and large quantities of vegetables and salads are grown for home consumption. Vines are grown in many of the monastery and other gardens for wine-making.

Geographical Distribution.

The plants collected on Athos Peninsula, and enumerated in the Systematic List, number 435 species of Spermatophyta, apart from a number of Cryptogams not considered in this section. The geographical distributions, outlined for the species, may be summarized as follows :

1. Widely distributed through the E.N. Temperate Region or more widely : 69.
2. Europe general, including also the Mediterranean Basin or Mediterranean Region : 78.
3. Mediterranean Region : 60.
4. Mediterranean Basin : 97.
5. E. Mediterranean Basin and Oriental : 56.
6. S. Europe : 7.
7. Central Europe : 16.
8. Balkan Peninsular types or Balkan Peninsular endemics : 40.
9. Athos Peninsular endemics :12.

The predominant Mediterranean character of the flora is indicated by the facts that 419 species have, wholly or in part, a Mediterranean distribution, and 272 species entirely a Mediterranean distribution (including Balkan Peninsular). The term Mediterranean is here used in the sense of the Mediterranean Botanical Region. The 16 Central European species alone indicate a very minor strictly northern element.

Some examples may be given of and remarks made concerning the plants of more limited distribution (5 to 9 as numbered above). The remarks give some general indications of the floristic history.

Species of more or less limited distribution in the E. Mediterranean Basin are often limited to countries bordering the Aegean Sea. They are part of the large floristic element which clearly indicates the essential climatic unity and common geological history of much of the now disrupted Aegean continent. Some extend some distance beyond the Aegean boundaries and may represent either species which have spread outwards, or have migrated to our area, or have become differentiated, over (approximately) their present distributional area, from some parental species. Examples of plants whose distribution has been classified under this heading are : *Aubrieta deltoidea* (L.) DC., *Malcomia flexuosa* S. et S., *Silene Fabaria* S. et S., *Hypericum olympicum* L., *Coronilla cretica* L., *Lotus peregrinus* L., *Trifolium radiosum* Wahlenb., *Saxifraga hederacea*, L., *Sedum litoreum* Griseb., *Rubia Olivieri* Rich., *Andryala dentata* S. et S., *Phagnalon graecum* Boiss. et Heldr., *Campanula phrygia* Jaub.

et Spach, *Arbutus Andrachne* L., *Erica verticillata* Forsk., *Myosotis cadmea* Boiss., *Lamium striatum* S. et S., *Phlomis samia*, L., *Euphorbia acanthothamnos* Heldr. et Sart., *E. graeca* Boiss. et Sprun., *Platanus orientalis* L., *Arum orientale* M.B., and *Cupressus sempervirens* L.

The South European types are of more limited distribution and, for our flora, represent mainly a western element. Representatives are: *Cardamine graeca* L., *Vicia Barbazitae* Ten. et Guss., *Bellis hybrida* Ten., *Cyclamen neapolitanum* Ten., *Scleranthus dichotomus* Schur, and *Ornithogalum tenuifolium* Guss.

The Central European types include some whose distribution is essentially south-east European (Dacian and Pannonian). It is naturally suggested that they reached Athos Peninsula (or the old Aegean continent) from the north. Many of them reach their southern limit in our area or in a corresponding latitude. Species grouped in this class include: *Erysimum crepidifolium* Reichb., *Isatis praecox* Kit., *Cnidium silaifolium* (Jacq.) Simk., *Leontodon crispus* Vill., *Campanula lingulata* W. et K., *Myosotis versicolor* Sm., *Verbascum banaticum* Roch., *Daphne Laureola* L., *Iris Reichenbachii* Heuff., and *Melica uniflora* Retz.

While the number of species classified as Central European is small (16), it must be pointed out that some species classified as of wide E.N. Temperate distribution or as general European, and some classified as Balkan Peninsular types or Balkan Peninsular endemics are also northern in their general distribution relative to Athos Peninsula. Extracting these, and adding on the 16 species classed as Central European, a total of 42 species is obtained as representing a relatively northern element in our list.

The Balkan Peninsular types and Balkan Peninsular endemics are species which either originated within the boundaries of the Balkan Peninsula and have spread little or not at all beyond them, or are relict species which have been exterminated elsewhere. They have previously been dealt with more fully [Turrill: Plant-Life of the Balkan Peninsula pp. 422–465 (1929)]. Examples from our present list are: *Berteroa orbiculata* DC., *Hesperis glutinosa* Vis., *Viola athois* W. Becker, *Hypericum Montbretii* Spach, *H. rhodoppeum* Friv., *Linum elegans* Sprun., *Astragalus angustifolius* Lam., *A. macedonicus* Hal. et Nadji, *Trifolium dolopium* Heldr. et Hausskn., *Saxifraga Grisebachii* Deg. et Dörfl., *Sempervivum marmoreum* Griseb., *Smyrnium Orphanidis* Boiss., *Pterocephalus perennis* (L.) Coult., *Carduus armatus* B. et H., *Centaurea Grisebachii* Nym., *Campanula Orphanidis* Boiss., *C. rupestris* S. et S., *Alkanna gracea* Boiss. et Sprun., *Onosma ottomanum* Friv., *Nepeta Sibthorpii* Benth., *Thymus heterotrichus* Griseb., *T. ocheus* Heldr. et Sart., *Euphorbia oblongata* Griseb., *Ophrys Reynholdii* H. Fleischm., *Agropyron sanctum* (Janka) Hack., and *Bromus fibrosus* Hack.

Many of these show how Athos Peninsula has shared in the characteristic floral wealth of the Balkan Peninsula. A few species, such as *Viola athois* W. Becker and *Agropyron sanctum* (Janka)

Hack. are nearly endemic to Athos Peninsula, the former being recorded only (and doubtfully) from S. Macedonia and the latter only from Thessaly, outside our area.

That the flora of an area so small as Athos Peninsula should have as many as about 20 endemic species, gives some indication of the special botanical interest of Aegean lands. Twelve of the species in our list are, so far as is known, to be found native only on Athos Peninsula. The full list of these is : *Corydalis Wettsteinii* Adamov., *Isatis athoa* Boiss., *Dianthus athous* Rech. fil., *Silene genistifolia* Hal., *Asperula athoa* Boiss., *Anthemis Sibthorpii* Griseb., *Centaurea athoa* DC., *C. chalcidicaea* Hayek, *C. pannosa* DC., *Helichrysum virgineum* (S. et S.) Boiss., *Armeria sancta* Janka, *Onosma paradoxum* Janka. Some of these, such as *Corydalis Wettsteinii* and *Onosma paradoxum*, have been considered as subspecies or varieties of more widely distributed species by some authors (e.g., Hayek). The others, however, are well-defined species, sometimes of no very close affinity with other existing species. These may be regarded as relict species or at least such as suggest long isolation of the species from existing lands.

SYSTEMATIC LIST.

Ranunculaceae.

Anemone hortensis L. Sp. Pl. 540 (1753) var. **purpureo-violacea** (*Boiss.*). *Anemone fulgens* J. Gay var. *purpureo-violacea* Boiss. Flor. Or. **1,** 12 (1867). *A. hortensis* L. var. *pavonina* (Lam.) Gren. et Godr. subvar. *purpureo-violacea* (Boiss.) Hayek, Prodr. **1,** 319 (1924).

Asbestochori Cemetery, north of Salonika, 11.4.34, in stony grassland, no. 2591 ; Simopetra, just above the arsenal, 13.4.34, stony open places in the macchia, no. 2370 ; near Karyes, 13.4.34, in grassy places, no. 2373.

No. 2591 had flowers with bright mauve sepals ; no. 2373 had pale mauve sepals, with or without a white blotch, but the plants showed a considerable range in width, shape, and number of sepals.

A. hortensis *L.* var. **fulgens** (*DC.*). *A. pavonina* Lam. var. (?) *fulgens* DC. Prodr. **1,** 18 (1824). *A. hortensis* L. var. *pavonina* (Lam.) Gren. et Godr. subvar. *fulgens* (DC.) Hayek Prodr. **1,** 319 (1924).

Mulyani Islands : second small island off Pyrgos, 15.4.34, in depauperated pseudomacchia and old olive groves, no. 2383.

Sepals bright scarlet, monochrome or with white or dark base.

The intraspecific variation of *A. hortensis* L., sensu lato, requires investigation from the cyto-genetical standpoint, but such an investigation should be, at least largely, on material of known wild origin and should be combined with a taxonomic and phytogeographical study of wild populations. The distribution of the var. (?) *purpureo-violacea* (Boiss.) suggests it may have to be given a somewhat higher taxonomic status.

Distribution (of species) : Mediterranean Basin and generally in the Mediterranean districts of the Balkan Peninsula.

Nigella arvensis *L.* Sp. Pl. 534 (1753).

Mulyani Islands : " Frying Pan Island," 5.6.34, *Mrs. Loch* no. 16.

Distribution : Mediterranean Region, Central Europe, and Caucasus, and in most districts of the Balkan Peninsula.

Ranunculus eriophyllus *C. Koch* in Linnaea, **19,** 46 (1847).

Lavra, near the monastery, 20.4.34, in tall herbage of a grassy hay meadow, no. 2532.

Distribution : Oriental, and in the southern and eastern districts of the Balkan Peninsula.

R. Ficaria *L.* Sp. Pl. 550 (1753).

Cultivated in the Herbarium Experimental Ground, as K. 1394, from tubers collected between Simopetra and Karyes, 13.4.34, in *Castanea* woods ; in flower at Kew 27.3.36.

The plant seems typical *R. Ficaria* L. and not *R. Ficaria grandiflora* F. Schultz, which latter is fairly widely distributed in South Europe. See Bot. Mag. t. 9199 (1930).

Distribution : Europe (general) and the Caucasus, and recorded from most districts of the Balkan Peninsula.

R. ophioglossifolius *Vill.* Hist. Pl. Dauph. **4,** 731 (1789).

Near the Xerxes Canal, 17.4.34, in marshy muddy ground, No. 2440 ; plateau between Chilandari and Pyrgos, 23.4.34, in damp marshy ground, no 2689.

The degree of hairiness of the flower-stalks and inflorescence branches varies very considerably.

Distribution : Mediterranean Region, Caucasus, and most districts of the Balkan Peninsula.

R. paucistamineus *Tsch.* in Flora **17,** 525 (1834).

Pond in the line of Xerxes Canal, 17.4.34, in water, no. 2441.

Submerged leaves only, not collapsing. Flowers relatively small.

Distribution : East North Temperate Region, and generally distributed in the Balkan Peninsula.

R. peltatus *Schrk.* Bayr. Flor. **2,** 103 (1789).

Pond in the line of Xerxes Canal, 17.4.34, in water, no. 2442.

With conspicuous floating leaves. Flowers relatively large.

Distribution : East North Temperate Region, and so far recorded from Greece, Cyclades, S. Macedonia, Dalmatia, in the Balkan Peninsula.

R. rumelicus *Griseb.* Spic. **1,** 305 (1843).

Above Simopetra, 13.4.34, stony rather dry places, no. 2325.

Distribution : Eastern Mediterranean Basin and southern, central, and eastern districts of the Balkan Peninsula.

R. sardous *Crantz* Stirp. Austr. **2,** 84 (1762).

Abundant along the site of Xerxes Canal, 17.4.34, in damp places, no. 2446.

Distribution : Mediterranean Basin, Central Europe, and Caucasus, and from nearly all the districts of the Balkan Peninsula.

Thalictrum minus *L.* Sp. Pl. 546 (1753) var. **olympicum** *Boiss.* Flor. Or. **1,** 8 (1867).

Mt. Athos peak, 1700–1900 m., among rocks, *H. G. Tedd*, no. 1490.

Height about 3 dm., flowers yellowish. Plant infrequent.

Distribution : (of species) North Temperate Region and from most districts of the Balkan Peninsula ; (of variety) mountains of northern Greece, Thessaly, Epirus, and Athos, doubtfully also from Caucasus.

Papaveraceae.

Corydalis Wettsteinii *Adamović* in Oesterr. Bot. Zeitschr. **56,** 174 (1906). *C. solida* (L.) Sw. subsp. *Wettsteinii* (Adamov.) Hayek Prodr. **1,** 365 (1925).

High above Karyes, 13.4.34, field-layer in *Castanea* woods, no. 2305 ; cultivated in Herbarium Experimental Ground, from tuber collected above Karyes, 13.4.34, in flower at Kew, 27.3.36.

Flowers very pale pink, the wings tipped with purple. The species in cultivation at Kew is easily damaged by late spring frosts, and suffered badly from those of the spring of 1935.

Distribution : Athos Peninsula (endemic).

Fumaria capreolata *L.* Sp. Pl. 701 (1753) var. **albiflora** Hamm. Mon. slägt. Fum. 25 (1857).

Panteleëmon, 14.4.34, on walls of outhouse of the monastery, no. 2271.

Corolla white, tips of wings blackish-purple.

Distribution : (of species) Mediterranean Basin and Central Europe and Mediterranean and transitional districts of the Balkan Peninsula.

F. flabellata *Gasp.* Rend. Acad. Nap. **1,** 51 (1842) sec. Pugsley in Journ. Linn. Soc. **44,** 266 (1919).

Mulyani Islands : small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2636.

White and dark purple flowers.

Distribution : Mediterranean Basin, but of a rather discontinuous distribution, recorded from Montenegro and Dalmatia in the Balkan Peninsula.

F. judaica *Boiss.* Diagn. Ser. **1,** viii. 15 (1849).

Kapsokalývia, 19.4.34, under walls on dry bushy slopes above sea, no. 2470.

Flowers very pale pink and not blackish at the tips.

Distribution : East Mediterranean Basin and Egypt ; recorded from the Cyclades, Dalmatia, and Istria.

F. macrocarpa *Parl.* Plant. nov. 5 (1842).

Simopetra, between arsenal and monastery, 13.4.34, no. 2289.

Flowers very pale pink, upper and lower petals greenish at tips, wings darker at tip. Fruits large.

Distribution : Oriental, and from Crete, Greece, Cyclades, S. Macedonia, and Dalmatia.

F. Thuretii *Boiss.* Diagn. Ser. **2,** i. 15 (1853), near var. **pikermiana** (*Boiss. et. Heldr.*) *Pugsley* in Journ. Linn. Soc. **44,** 294 (1919).

Mulyani Islands : small island opposite Pyrgos, 15.4.34, in brushwood. coll. *H. G. Chick*, no. 2393 ; Simopetra, between monastery and arsenal, 13.4.34, between stones no. 2298.

Flowers recurved, rose-pink wings, blackish-purple at tips.

Distribution (of species) : centred in the Balkan Peninsula, especially in the south and west, but extending to northern Asia Minor and the Banat, and also recorded from Cyprus.

Glaucium flavum *Crantz*, Stirp. Austr. fasc. ii. 133 (1763) more or less approximating to the var. **leiocarpum** (Boiss.) Stoy. et Stef.

Panteleëmon, 14.4.34, stony places against the base of the monastery buildings and walls, no. 2263, petals yellow without blotch ; east of Pyrgos, 24.4.34, sandy shore south-east of the boundary wall of the Holy Mountain, no. 2721, flowers pale yellow, with dark blotch at petal base.

Distribution (of species) : coastal districts of Europe and the Mediterranean Basin east to the Caucasus ; (of variety) essentially East Mediterranean Basin.

The variation of *G. flavum* has been recorded in Kew Bull. 1933, 174.

In addition to the collected specimens enumerated above series of plants have been grown in the Herbarium Ground at Kew from seeds collected on the Athos Peninsula. These include the following :

K. 1441, east of Pyrgos, south-east of the boundary wall of the Holy Mountain, seeds collected 24.4.34, plants in flower at Kew 20.8.35. Petal blotch well marked.

K. 1459, Panteleëmon, seeds collected 14.4.34, plants in flower at Kew 20.8.35. Petal blotch almost obsolete on both surfaces.

K. 1468, Pantocratoros, seeds collected 21.4.34, plants in flower at Kew 20.8.35. Petal blotch well marked on outer (lower) surface.

K. 1540, 1541, near Pantocratoros, seeds collected 11.7.34, *H. G. Tedd*, in flower at Kew 8.8.35 and 29.8.36. No petal blotch on outer (lower) surface, faint on inner (upper) surface.

The above numbers represent about 40 individual plants. These showed a wide range of variation in the degree of bristle development on the sepals (from strongly setose to completely glabrous) and in the degree of roughness of the fruits (from distinctly asperous to quite smooth), as well as in the petal markings. All the plants, however, have fruits rather more slender than those of Western European *G. flavum*, though there is some variation in this character.

Hypecoum grandiflorum *Benth.* Cat. Pyr. 91 (1826).

Lembet Cemetery, north of Salonika, Greek Macedonia, 11.4.34, grassy and waste places, no. 2623.

Deep yellow-orange flowers.

Distribution: Mediterranean Region and Caucasus; widely spread in the Balkan Peninsula.

H. procumbens *L.* Sp. Pl. 124 (1753) var. **glaucescens** (*Guss.*) *Heldr.* in Bull. Herb. Boiss. **6,** 232 (1898).

Head of Cassandra Gulf, Greek Macedonia, 12.4.34, sandy ground not far from the sea, no. 2628.

Distribution: Mediterranean Region; Mediterranean districts of the Balkan Peninsula.

Papaver hybridum *L.* Sp. Pl. 506 (1753).

Above Pyrgos, 25.4.34, in cornfields on hill slopes, no. 2751.

Petals crimson.

Distribution: E. N. Temperate Region; widespread in the Balkan Peninsula.

Roemeria hybrida (*L.*) *DC.* Syst. **2,** 92 (1821).

Head of Cassandra Gulf, Greek Macedonia, 12.4.34, sandy place not far from the sea, no. 2631.

Distribution: E. N. Temperate Region; Mediterranean and Transitional districts of the Balkan Peninsula.

CRUCIFERAE.

Alliaria officinalis *Andrz.*, in M. Bieb. Flor. Taur.-Cauc. **3,** 445 (1819).

High above Lavra, 620 m., on slopes of Athos peak, 20.4.34, shady stony ground in *Abies* zone, no. 2522.

Distribution: E. N. Temperate Region; general in the Balkan Peninsula, except Crete.

Alyssoides utriculatum (*L.*) *Med.* Phil. Bot. **1,** 189 (1789) var. **graecum** (*Reut.*) *Hayek* Prodr. **1,** 443 (1925).

Kapsokalývia, 19.4.34, among stones on hot, dry, limestone slopes, no. 2474.

High above Lavra, 815 m., on slopes of Athos peak, 20.4.34, on open limestone rocks above lower *Abies* zone, no. 2524.

Petals yellow to bright yellow.

Distribution (of var.): Balkan Peninsula, fairly widespread, extending to Italy and Bithynia.

Alyssum desertorum *Stapf* in Denkschr. Akad. Wiss. Wien **51,** 302 (1886).

Mikra Cemetery, north of Salonika, Greek Macedonia, 11.4.34, dry stony ground, no. 2664.

Distribution: E. N. Temperate Region; fairly widespread in the Balkan Peninsula, especially in the central and southern districts.

A. murale *W. et* K. Pl. Rar. Hung. **1,** 5, t. 6 (1802).

Near the Russian skete, east of Pyrgos, just within the boundary wall of the Holy Mountain, 23.4.34, on stony ground, no. 2709.

Distribution: Balkan Peninsular type, fairly widespread (not Crete), and extending to north and south-east.

A. parviflorum *Fisch.* ex M. Bieb. Flor. Taur.-Cauc. **3,** 434 (1819).

Asbestochori Cemetery, north of Salonika, Greek Macedonia, 11.4.34, dry stony ground, no. 2587.

Distribution: Central Europe, Mediterranean Basin, and Caucacus; widespread in the Balkan Peninsula.

A. umbellatum *Desv.* Journ. Bot. **3,** 173 et 184 (1814).

Simopetra, between the arsenal and the monastery, 13.4.34, in dry stony ground, nos. 2346, 2350; Mulyani Islands: small island off Pyrgos, 15.4.34, dry stony places, no. 2396.

Pale yellow petals.

The branches of the hairs on the silicules of no. 2396 are rather longer than on the fruits of the other two numbers. A similar range in indumentum is to be seen in Asia Minor and Syrian material at Kew.

Distribution: Oriental; Cyclades, N. Macedonia, Thrace.

Arabidopsis Thaliana (*L.*) *Schur* Enum. Plant. Transs. 55 (1866).

Near Karyes, 13.4.34, on grassy bank, no. 2377.

Distribution: General European, Mediterranean Region, Caucasus; general in the Balkan Peninsula.

Arabis Turrita *L.* Sp. Pl. 665 (1753).

Above Karyes, 14.4.34, in woods in shade, no. 2309.

Distribution: General European, Mediterranean Basin, east to Caucasus; general in the Balkan Peninsula (except Crete).

A. verna (*L.*) *R. Br.* in Ait. Hort. Kew. ed. 2, **4,** 105 (1812).

High above Lavra, 620 m., on slopes of Athos peak, 20.4.34, stony shady ground in *Abies* zone, no. 2521.

Petals purple.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts in the Balkan Peninsula.

Aubrieta deltoidea (*L.*) *DC.* Syst. **2,** 294 (1821).

Below Zographu Monastery, 16.4.34, stony ground in macchia zone, no. 2429.

Distribution: Oriental: southern and Transitional districts in the Balkan Peninsula.

Berteroa sp. probably *B. incana* (*L.*) DC. Syst. **2,** 291 (1811) var. *stricta* (*Boiss.*) Turrill in Kew Bull. 1920, 181.

Between Pyrgos and Xerxes Canal, 17.4.34, grassy ground by roadside, below macchia, no. 2454; head of Cassandra Gulf, Greek Macedonia, 12.4.34, no. 2627.

Petals white.

The specimens are too young for certain identification.

B. orbiculata *DC.* Syst. **2,** 293 (1821).

Mulyani Islands: small island off Pyrgos, 25.4.34, on the dry, grassy, and rather flat top of the island, no. 2764.

Growing with no. 2763 (see immediately below) and similar to it except that the fruits are densely hairy with stellate and simple hairs.

Distribution: a Balkan Peninsular type extending to N. Asia Minor; N. and S. Macedonia, N. Bulgaria, Rodope Massif.

B. orbiculata *DC.* var. **glabra** *Turrill* var. nov. siliculis glabris vel fere glabris distinguitur.

Foot of cliff leading to Simopetra monastery, spring 1932, *H. G. Chick* 60; in ravine by shore, Aghios Dionysios, spring 1932, *H. G. Chick* 70; Mulyani Islands: small island off Pyrgos, 25.4.34, dry grassy and stony flat top of the island, no. 2763, flowers yellow fading to cream, fruit glabrous or with a very few stiff simple hairs (type); between the arsenal and the monastery of Simopetra, 13.4.34, stony open places in the macchia zone, no. 2287.

Hayek, in Prodr. **1,** 427 (1925) makes the new combination *Berteroa samolifolia* (Desf.) Hayek for *B. orbiculata* DC. This combination is based on the identification of *Alyssum samolifolium* Desf. Choix de Plantes 66, t. 49 (1808) with *B. orbiculata* DC. Neither the description nor the figure agree with this latter, and the plant is said to come from Armenia. In *A. samolifolium* the whole plant is said to be glabrous and the petals white. Neither of these characters is true for *B. orbiculata*. The latter was described from material collected by D'Urville " in arenosis ad Xerxis canalem " and the original description fits very well our no. 2764, except that the nearly mature silicules in the new material are somewhat longer.

Biscutella ciliata *DC.* in Ann. Mus. Nat. **18,** 297 (1811) sensu Machatschki-Laurich in Bot. Archiv. **13,** 30 (1926).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2426 ; cultivated, as K. 1482, in the Herbarium Experimental Ground, Kew, 13.7.35, from seed collected in the same locality at the same time.

Distribution : Mediterranean Basin ; Mediterranean districts of the Balkan Peninsula.

Under the older classification of Halácsy our material fits into *B. didyma* L. var. *leiocarpa* (DC.) Hal. Consp. **1,** 105 (1901).

Brassica cretica *Lam.* Encycl. **1,** 747 (1783).

Above Simopetra, 13.4.34, growing in rock crevices in open places between high macchia, no. 2332.

Distribution : Oriental ; Crete, Greece, Cyclades, Corfu, Athos Peninsula.

The plants grow to large size and the flowers have pale yellow petals.

Accounts of this interesting species will be found in the Pflanzenreich iv. 105, 36 (1919) by O. E. Schulz and in Oesterr. Bot. Zeitschr **82,** 309 (1933) by Max Onno. In the former work, Athos plants are included in the type, in the latter in the var. *nivea* (Boiss. et Sprun.) O. E. Schulz. The var. *nivea* was described (as a species) in Boiss. Diagn. I. **1,** 72 (1847) from material collected at Acrocorinth. The petals are definitely said to be white, a character whence the epithet *nivea* is derived. In our Simopetra material the petals are definitely yellow on the living plant, hence either Onno is incorrect or both the type and the variety occur on the Athos Peninsula.

Cakile maritima *Scop.* Flor. Carn. **2**, ed 2, 35 (1772).

South-east of Pyrgos, 24.4.34, among stones by the sea, no. 2743. Petals lilac.

Distribution : General European and Mediterranean Basin east to the Caucasus ; general in coastal parts of the Balkan Peninsula.

Calepina irregularis *(Asso) Thell.* in Schinz u. Thell. Flor. Schw. ed. 2, **1,** 218 (1905).

Asbestochori Cemetery, north of Salonika, dry stony ground, no. 2616.

Distribution : Central European and Mediterranean Regions east to Caucasus ; fairly widespread in the Balkan Peninsula.

Camelina rumelica *Vel.* in Sitz. böhm. Ges. Wiss. 448 (1887).

Head of Cassandra Gulf, Chalkidike Peninsula, 12.4.34, no. 2632.

White petals. The species is very close to *C. microcarpa* Andrz.

Distribution : Balkan Peninsular type ; Greece, N. and S. Macedonia, Thrace, N. and S. Bulgaria, Serbia.

Capsella Bursa-pastoris *(L.) Moench.* Meth. 271 (1794). Mikra Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2593.

Distribution : now more or less cosmopolitan ; widespread in the Balkan Peninsula.

Cardamine graeca *L.* Sp. Pl. 655 (1753).

Simopetra, between the monastery and the arsenal, 13.4.34, grassy places in half shade, no. 2360 and wall crevices and slopes, no. 2294.

Distribution : South European ; widespread in Mediterranean and Transitional districts in the Balkan Peninsula.

C. hirsuta *L.* Sp. Pl. 655 (1753).

Above Lavra, 770 m., slopes of Athos peak, 20.4.34, in stony ground in mixed *Abies* and broad-leaved forest, no. 2515.

Distribution : North Temperate Region ; general in the Balkan Peninsula.

Clypeola Jonthlaspi *L.* Sp. Pl. 652 (1753).

In the Kew Bulletin 1935, 1, an account was published of the genus *Clypeola* and its intraspecific variation. In this account our Athos and other South Macedonian specimens of *C. Jonthlaspi* were referred to varieties based on fruit size, indumentum, and shape. In addition to these specimens a number of packets of seeds were collected which were sown in pots and grown in the insect-proof house of the Herbarium Ground, Kew, 1935. The following results were obtained :

Index number.	Locality.	Fruits sown, indumentum and diam. in mm.	Approximate number of plants grown.	Fruits of offspring.
K.1496 ...	Athos, Simopetra ...	w H d H 2·5–2·75	75	All w H d H 2·5–2·75
K.1497 ...	Athos, above Lavra	w H d H 4·0	25	All w H d H 4·0
K.1498 ...	Athos, between Kapsokalývia and Lavra	w H d H 4·0–4·5	30	All w H d H 4·0
K.1499 ...	Athos, Kapsokalývia	w H d H 3·5–4·0	210	All w H d H 3·5–4·0
K.1500 ...	Athos, Dochariou...	w H d H 3·75	100	All w H d H 3·5–3·75
K.1501 ...	Athos, above Lavra	w H d H 3·5–4·0	150	All w H d H 3·5–4·0
K.1502 ...	Athos, Zographu ...	w H d H 4·0	6	All w H d H 3·5–4·0 (few good fruits set).
K.1503 ...	Athos, Zographu ...	w H d H 3·5–4·0	50	All w H d H 3·5–4·0
K.1504 ...	Athos, Zographu ...	w H d H 3·5–4·0	25	All w H d H 3·5–4·0
K.1505 ...	Athos, Zographu ...	w H d H 3·0–3·5	18	All w H d H 3·0–3·5
K.1569 ...	N. of Salonika, Asbestochori Cemetery	w H d G 3·0–3·5	320	All w H d G 3·0–3·5
K.1570 ...	N. of Salonika, Asbestochori Cemetery	w H d H 3·0–3·5	50	All w H d H 3·0–3·5

The above table shows clearly that in *Clypeola Jonthlaspi* fruit indumentum and fruit size are characters with a genetic basis. Our use of them as intraspecific varietal characters is, therefore, so far justified. More, however, can be stated as a result of the cultural experiments. In several of the original plants the fruit-shape was slightly different from the commoner (in our material) orbicular-elliptic. Thus in K.1503 the fruits were almost or quite orbicular, and the fruits of the offspring had the same shape. In K.1505 the original fruits were obovate and in the offspring the fruits were uniformly of the same shape. This suggests that intraspecific subdivision on genetical fruit characters could be carried even further than was done in the paper quoted above.

The statements made with regard to a high degree of correlation between fruit size and the size of the plant as a whole and to fluctuation in leaf-size and shape have also been confirmed.

Distribution (of species) : Mediterranean Region ; Mediterranean and Transitional districts of the Balkan Peninsula.

Crambe hispanica *L.* Sp. Pl. 671 (1753).

Simopetra, between the monastery and the arsenal, 13.4.34, no. 2288 ; Dochiariou, 18.4.34, near the coast not far from the monastery, no. 2508.

Petals white.

Distribution : Mediterranean Region ; Greece, Thessaly, Corfu, Dalmatia.

Erophila verna (*L.*) *E. Meyer* sensu O. E. Schulz in Pfanzenr. iv. 105, 345 (1927) var.

Lembet Cemetery, near Salonika, 11·4·34, no. 2585 ; Asbestochori Cemetery, north of Salonika, 11·4·34, dry stony ground, no. 2586.

Distribution (of species) : N. Temperate Region ; general in the Balkan Peninsula.

The specimens seem related to both var. *majuscula* (Jord.) Hausskn. and var. *acrocarpa* (Brenner) O. E. Sch.

Erysimum crepidifolium *Reichb.* Pl. Crit. **1,** 8, t. 6 f. 13 (1823).

Dionysiou, 18.4.34, rocks above the monastery, no. 2507. Flowers yellow.

Distribution : Central European ; N. Macedonia, Thrace, N. Bulgaria, Serbia, Hercegovina.

The leaves are more entire than usual in this species. The endemic *E. calycinum* Griseb. differs in having all the hairs on the leaves bifid and the fruiting pedicels shorter.

Hesperis glutinosa *Vis.* in Flora **12,** Ergänz. **1**, 16 (1829). var. **Visianii** (*Fourn.*) *Hayek* Prodr. **1,** 417 (1925).

Above Simopetra arsenal, 13·4·34, stony places, no. 2369, pale yellow petals ; high above Lavra, 830 m., on slopes of Athos peak, 20·4·34, no. 2525, petals greenish to purplish brown.

Distribution (of species) : Italy, S. Macedonia, Bulgaria, Hercegovina, Dalmatia, Croatia, Istria.

Isatis athoa *Boiss.* Flor. Or. Suppl. 64 (1888) e descr.

Mt. Athos (Panaghia), 12.7.34, 1540 m., waste stony places among rocks, *H. G. Tedd*, no. 1518.

Flowers yellow, flowering mostly finished.

Distribution : Athos Peninsula (endemic).

This agrees well with the original description except that the pedicels are shorter than the fruits.

Hayek, Prodr. **1,** 412 (1925), gives the reference " I. tinctoria var. a." Griseb. Spic. **1**, 286. The name *I. tinctoria* var. *athoa* has not been traced, but the name *I. tinctoria* L. var. *stenocarpa* is given with a description by Grisebach. Boissier's type was collected on Athos by Pichler.

I. praecox *Kit.* in Tratt. Arch. **1,** 40, t. 68 (1812).

High above Lavra, 830 m., slopes of Athos peak, 20.4.34, open limestone rocks above the *Abies* zone, no. 2523.

Distribution : Dacian and Pannonian ; S. Macedonia, N. and S. Bulgaria, Serbia.

The specimens are young and the identification is somewhat uncertain.

Lepidium spinosum *Ard.* Anim. Spec. xxxiv., t. 16 (1759).

Near Xerxes Canal, 17.4.34, in cultivated fields, no. 2444.

Plants very rigid and erect.

Distribution : Oriental ; Crete, Greece, Cyclades, S. Macedonia, Thrace, Thracian Islands, S. Bulgaria.

Lunaria annua *L.* Sp. Pl. 653 (1753), subsp. **pachyrhiza** (*Borb.*) *Hayek* Prodr. **1,** 424 (1925).

Below Zographu Monastery, 16.4.34, shady brushwood at foot of cliff in macchia zone, no. 2432.

Distribution: Central European; general in the Balkan Peninsula, except Crete, Cyclades, Thessaly, Epirus, S. Bulgaria, and S. Croatia.

Malcomia flexuosa *S. et S.* Flor. Graec. **7,** 33, t. 634 (1830).

Simopetra, between the arsenal and the monastery, 13.4.34, stony open places in macchia, No. 2299, dark mauve petals; east of Kapsokalývia, 19.4.34, dry limestone (marble) slopes above the sea, no. 2480; flowers white, turning pale mauve with age; Mulyani Islands, small islet off Pyrgos, in dry open places on scree and in rock clefts, coll. *H. G. Chick*, no. 2639; grown in the Herbarium Ground, Kew, from seed collected on the small islet of the Mulyani Islands, opposite Pyrgos, 14.6.34, *Mrs. Loch*, as K. 1493 and K. 1494.

Distribution: E. Mediterranean Basin; Crete, Greece, Cyclades, Epirus, Albania, Athos Peninsula, Thrace.

Matthiola incana (*L.*) *R. Br.* in Ait. Hort. Kew. ed. 2, **4,** 119 (1812).

Athos Peninsula, brought by the local postman to Pyrgos, 15.4.34, no. 2403, and cultivated from seeds, from near Chilandari, 22.4.34, in the Herbarium Ground, Kew, 1935–36, as K.1472.

Distribution: essentially Mediterranean Basin and Western Europe; most of the Mediterranean districts of the Balkan Peninsula.

M. sinuata (*L.*) *R. Br.* in Ait. Hort. Kew. ed. 2, **4,** 120 (1812) subsp. **glandulosa** (*Vis.*) *Vierh.* in Verhl. zool.—bot. Ges. Wien, **64,** 254 (1914).

Mulyani Islands: the smallest island off Pyrgos, 9.4.34, rock clefts and scree, coll. *H. G. Chick*, no. 2612.

Plants grown from seeds in the Herbarium Ground, Kew, from the same source, grew well till the late winter (1935-36) when all were killed by the (not very severe) winter frosts. The Athos plant is less hardy in the open at Kew than is *M. incana* from Athos.

Distribution: essentially Mediterranean Basin; many Mediterranean districts of the Balkan Peninsula.

Nasturtium officinale *R. Br.* in Ait. Hort. Kew. ed. 2, **4,** 110 (1812).

East of Pyrgos, 15.4.34, damp ground in ravine, coll. *H. C. Chick*, no. 2603.

Distribution: N. Temperate Region; general in the Balkan Peninsula.

Thlaspi perfoliatum *L.* Sp. Pl. 646 (1753).

Mikra Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2665; grown in the Herbarium Ground, Kew, 26.6.35, as K.1447, from seeds collected near Kapsokalývia, 19.4.34.

Distribution: General European and Mediterranean Basin east to the Caucasus; general in the Balkan Peninsula.

Cistaceae.

Cistus monspeliensis *L.* Sp. Pl. 524 (1753).

Near Pyrgos, abundant in depauperated macchia, 17.4.34, in dry treeless brushwood, no. 2459.

Leaves very odorous; rather small white flowers.

Distribution: Mediterranean Basin; Greece, Cyclades, Corfu, Albania, Athos, Dalmatia, Istria.

C. salviifolius *L.* Sp. Pl. 524 (1753).

Mulyani Islands: Pontiko Island, 15.4.34, no. 2399; also from the same islands, 13.4.34, coll. *H. G. Chick*, no. 2640.

Flowers fairly large, petals white.

Distribution: Mediterranean Basin east to Caucasus; most Mediterranean and Transitional districts of the Balkan Peninsula.

C. villosus *L.* Sp. Pl. ed. 2, 736 (1762), as *C. pilosus*, see Gen. Plant. ed. 6, pag. ult. (1764) subsp. **creticus** (*L.*) *Hayek* Prodr. **1,** 489 (1925).

Mulyani Islands: second small island off Pyrgos, 15.4.34, coll. *H. G. Chick*, no. 2402.

Petals pink.

Distribution: Mediterranean Basin east to the Caucasus; most Mediterranean and Transitional districts of the Balkan Peninsula.

Fumana thymifolia (*L.*) *Verl.* var. **glutinosa** (*L.*) *Burn.* Flor. Alp. Mar. **1,** 164 (1892).

Near Dochiariou, 18.4.35, stony macchia slopes, no. 2505; near Pyrgos, 25.4.34, dry stony ground, no. 2766.

Flowers small, petals yellow.

Distribution: Mediterranean Basin; most Mediterranean and Transitional districts of the Balkan Peninsula.

Helianthemum nitidum *Clem.* sensu Hayek Prodr. **1,** 495 (1925) var. **glabrum** (*Koch*) ep. Janchen in Oesterr. Bot. Zeitschr. **58,** 395 6 (1908).

Athos peak, 1840 m., 12.7.34, rocky places, *H. G. Tedd*, no. 1519.

Distribution (of species): Central European and Caucasus; Albania, N. Macedonia, Montenegro, Bosnia, Hercegovina, Dalmatia, S. Croatia.

H. nummularium (*L.*) *Mill.* Dict. ed. 8 (1768).

Bushy slopes above the Roumanian Prodromus Skete, 19.4.34, dry slopes in macchia, not on limestone, no. 2496.

Distribution: General European and Mediterranean Region; general in the Balkan Peninsula.

The subspecies and varieties of this species (as accepted by Hayek, Prodr. **1,** 493–4: 1925) badly need revision.

Tuberaria guttata (*L.*) *Fourr.* in Ann. Soc. Linn. Lyons N.S. **16,** 340 (1868). *Helianthemum guttatum* Mill. Gard. Dict. ed. 8 (1768).

Near Pyrgos, 17.4.34, sandy slopes in depauperated macchie, no. 2461, petals unspotted; Mulyani Islands: small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2609; Longos (Sithonia) Peninsula, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd*, no. 2649, yellow petals with basal blotch.

Distribution: Mediterranean Basin; widespread in the Balkan Peninsula, especially in the Mediterranean and Transitional districts.

Nos. 2461 and 2609 are to be placed with the var. *plantaginea* (Willd.) Grosser in Pflanzenr. iv. 193, 57 (1903). One piece on the sheet of no. 2649 is considered to belong to the "forma" *viscoso-puberula* (Willk.) Vierh. in Oesterr. Bot. Zeitschr. **64,** 471 (1914).

Violaceae.

Viola alba *Bess.* Prim. Flor. Galic. **1,** 171 (1809) subsp. **scotophylla** *W. Becker* in Ber. Bayr. Bot. Ges. **8,** 2, 257 (1902) var. **violacea** *Wiesb.* in Deutsch. bot. Monat. **3,** 45 (1885).

On hills above Karyes, 13.4.34, shady places in woods, no. 2319.

Very sweet-scented indeed, of powerful *V. odorata* odour; soboles present; petals of deep violet colour all over; spur hooked and of deep colour.

Distribution (of species): Central Europe and Mediterranean Region; widespread in the Balkan Peninsula, but not Crete.

V. athois *W. Becker* in Bull. Herb. Boiss. sér. 2, **2,** 854 (1902).

Between Simopetra and Karyes, about 700 m., 13.4.34, in woods, grassy places, and brushwood, in half-shade, no. 2330, small plants with the lower leaves with more orbicular-ovate laminae than usual; Athos peak, 12.7.34, from 150–1970 m., among rocks, *H. G. Tedd* no. 1499, corolla violet-blue, with fragrant odour; grown in the Herbarium Ground, Kew, 20.8.35, etc. (flowers and fruits), as K. 1532, from seed collected, by *H. G. Tedd*, on Athos peak.

Distribution: S. Macedonia and Athos Peninsula.

V. Kitaibeliana *R. et S.* Syst. **5,** 383 (1819).

Mulyani Islands, 15.4.34, amongst grass and brushwood, nos. 2397, 2398.

Pale yellow upper petals, dark yellow lower petals.

Distribution : South Europe, E. Mediterranean east to Caucasus ; widespread in the Balkan Peninsula, but not Crete.

V. Riviniana *Reichb.* Pl. Crit. **1,** 81, f. 202–208 (1823).

Between Simopetra and Karyes, about 460 m., 13.4.34, in semi-shady places, no. 2327.

Pale violet-coloured corollas with yellow spur.

Distribution : General European ; central and northern districts of the Balkan Peninsula.

CARYOPHYLLACEAE.

Agrostemma Githago *L.* Sp. Pl. 435 (1753).

Hills behind Pyrgos, 6.6.34, *Mrs. Loch* no. 14.

Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

Arenaria leptoclados (*Reichb.*) *Guss.* Flor. Sic. Syn. **2,** 824 (1844) var. **viscidula** (*Rouy et Fouc.*) *Williams* in Journ. Linn. Soc. **33,** 368 (1898).

Near Karyes, 13.4.34, on grassy bank, no. 2374 ; Chalkidike Peninsula, head of Cassandra Gulf, 12.4.34, no. 2629 ; Asbestochori Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2661 ; Mikra Cemetery, north of Salonika, 11.4.34, dry stony ground, nos. 2666, 2667.

Distribution (of species) : E. N. Temperate Region ; widespread in the Balkan Peninsula.

A. rotundifolia *M. Bieb.* Flor. Taur.-Cauc. **1,** 343 (1808) var. **pauciflora** *Boiss.* Flor. Or. **1,** 700 (1867).

Athos peak, 12.7.34, 1970 m., rocks and stony places, *H. G. Tedd* no. 1503.

A sprawling plant with white petals.

Distribution (of species) : Pannonian, Oriental, Caucasian ; Thessaly, Albania, N. and S. Macedonia, Thracian Islands, N. Bulgaria, Rodope Massif, Serbia, Montenegro.

A. serpyllifolia *L.* Sp. Pl. 423 (1753) var. **viscida** *DC.* Flor. Fr. **6,** 611 (1815).

Near Karyes, 13.4.34, on grassy bank, no. 2374.

Distribution : now more or less cosmopolitan ; widespread in the Balkan Peninsula.

The variations and relationships of *A. leptoclados* Guss. and *A. serpyllifolia* L. require full investigation.

Cerastium banaticum (*Roch.*) *Heuff.* in Verhl. zool.-bot. Ges. **8,** 77 (1858).

Athos peak, 1480 m., 12.7.34, rock crevices, *H. G. Tedd* no. 1501. Growing in tufts ; white petals.

Distribution : Balkan Peninsular type ; N. and S. Macedonia, Athos, Thrace, Thracian Islands, N. and S. Bulgaria, Rodope Massif, Serbia.

C. brachypetalum *Desp.* in Pers. Syn. **1,** 520 (1805) var. **eglandulosum** *Fenzl* in Ledeb. Flor. Ross. **1,** 404 (1842).

Near Karyes, 13.4.34, on grassy bank, no. 2376.

Distribution : Central European, Mediterranean Region, Caucasus : general in the Balkan Peninsula.

C. glutinosum *Fr.* Nov. Flor. Suec. ed. 2. 132 (1828) subsp. **obscurum** (*Chaub.*) *Schinz et Kell.* sensu Hayek Prodr. **1,** 211 (1924).

Asbestochori Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2660.

Distribution : General European and Mediterranean Region ; widespread in the Balkan Peninsula.

C. illyricum *Ard.* Animodv. **2,** 26 (1764).

Mulyani Islands : small island opposite Pyrgos, 15.4.34, dry stony places, no. 2381 ; grown from seed, collected on the same island, 15.4.34, in the Herbarium Ground, Kew, 20.6.35 (flowers) and 13.7.35 (fruits), as K.1457.

Distribution : Oriental or Balkan Peninsular type ; most Mediterranean and Transitional districts of the Balkan Peninsula.

If one follows the account of Bornmüller, in Fedde Repert. **25,** 35, 36 (1928), this should probably be called subsp. *pilosum* (S. et S.) Bornm., vix Aschers. et Graebn. Syn. **5,** i, 685 (1917). The published accounts, however, are very confused. Plants with intermediate characters and character combinations occur in the same collections and probably many of the characters relied upon are merely fluctuations due to very local habitat conditions.

C. semidecandrum *L.* Sp. Pl. 438 (1753).

Grown in the Herbarium Ground, Kew, from seeds collected between Pyrgos and Xerxes Canal, 17.4.34, in flower and fruit at Kew, 13.7.35, as K.1450.

Distribution : Central European, Mediterranean Basin, east to Caucasus; most districts of the Balkan Peninsula, but not Thessaly and Epirus.

The flowers and fruits are small and the plants are not altogether typical.

C. glomeratum *Thuill.* Flor. Par. ed. 2, 226 (1799). *C. viscosum* L. Sp. Pl. 437 (1753).

Near Karyes, 13.4.34, on grassy bank, no. 2375 ; Mulyani Islands, 15.4.34, stony grassy places, no. 2380 ; cultivated in the Herbarium Ground, Kew, 20.6.35 and 19.7.34, from seed collected on the hills behind Pyrgos, 25.4.34, as K.1448.

Distribution : now more or less cosmopolitan ; general in the Balkan Peninsula.

Dianthus athous *Rech. fil.* in Fedde Rep. **31,** 159/623 (1932).

Athos peak, 1700 m., 12.7.34, rocky places, *H. G. Tedd* no. 1524.

Distribution : endemic to Athos Peninsula.

Holosteum umbellatum *L.* Sp. Pl. 88 (1753) var. **glandulosum** *Vis.* Stirp. Dalm. 37 (1826).

Grown in the Herbarium Ground, Kew, as K.1449, 20.6.35, from seeds collected near Stavronikita, 21.4.34 ; Asbestochori Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2580.

Distribution (of species) : E. N. Temperate Region ; general in the Balkan Peninsula.

H. umbellatum *L.* var. **hirsutum** *Turrill*, var. nov.

Herba a basi multo ramosa, caulibus diffusis inferne glabris superne plus minusve dense glandulosis. *Folia* inferiora late spathulato-oblanceolata, usque ad 2·3 cm. longa et 7 mm. lata, superiora latissime ovata vel elliptica vel fere orbicularia, omnia plus minusve glanduloso-ciliata et in pagina superiore hirsuta. *Sepala* 4–5 mm. longa (in fructu 5–6 mm. longa), glabra. *Petala* usque ad 4·5 mm. longa, glabra, ciliata, apice irregulariter crenulato-dentata. *Stamina* 10.

Mulyani Islands : small second island off Pyrgos, 15.4.34, on rocks near the sea, no. 2405.

This is an interesting variety. The plants have the stems much branched from the base, relatively large leaves which are hairy on the upper surface and broader than in other varieties. The upper cauline leaves are shorter and relatively broader, being broadly ovate to nearly orbicular.

H. umbellatum is a very polymorphic species. Ascherson and Graebner (Synop. **5,** i., 515 seq. : 1916) record a considerable number of varieties and forms. Material (including the var. *glandulosum* and the species or variety *H. glutinosum* F. et M.) grown at Kew under a range of conditions has shown considerable plasticity. Gay (*Ann.* Sci. Nat. Sér. 3, **4,** 23 : 1845) united *H. glutinosum* F. et M. and *H. tenerrimum* Boiss, with *H. umbellatum* as varieties. There is evidence at Kew in favour of this, since a large series of specimens shows almost continuous variation from Western European, relatively glabrous, *H. umbellatum*, to densely glandular Caucasian or Persian *H. glutinosum*, though no European material has been seen which matches the extreme eastern *H. glutinosum*. The number of stamens is also a variable character, but the number is usually higher in eastern than in western

material. In some characters the plant here described as *H. umbellatum* var. *hirsutum* is intermediate between *H. umbellatum* s. s. and *H. glutinosum*.

Kohlrauschia velutina (*Guss.*) *Reichb.* Icon. **6,** 43 (1844).

Above Simopetra, 13.4.34 stony ground, no. 2337 ; near Lavra, 19.4.34, dry stony ground, no. 2469.

Distribution : Mediterranean Region ; fairly widespread in the Balkan Peninsula.

Minuartia tenuifolia (*L.*) *Hiern* in Journ. Bot. **37,** 321 (1899) subsp. **hybrida** (Vill.) Mattf. in Engl. Bot. Jahrb. **57,** Beibl. 126, 29 (1921).

Above the Roumanian Prodromos Skete, near Athos point, 19.4.34, stony slopes in the macchia, not on limestone, no. 2499 ; near Chilandari, 22.4.34, on walls, no. 2673 ; grown in the Herbarium Ground, Kew, 19.7.34, as K.1467 from seeds collected near Chilandari, 22.4.34.

Distribution (of species) : Central Europe and Mediterranean Region ; fairly widespread in the Balkan Peninsula.

The specimens show an interesting range in the degree of development of the glandular pubescence on the calyx.

M. verna (*L.*) *Hiern* in Journ. Bot. **37,** 320 (1899) subsp. **Gerardii** (*Willd.*) *Graebn,* var. **mediterranea** (*Fzl.*) *Graebn.*, in Asch. et Graebn. Synop. Flor. Mitt.-Eur. **5,** i. 746 (1918). See also Hayek, Prodr. **1,** 186 (1924) and Halácsy in Herb. Kew.

Athos peak, 12.7.34, 1960 m., rock crevices, *H. G. Tedd* 1502.

Petals white.

Distribution (of species) : E. N. Temperate Region ; widespread in the Balkan Peninsula.

Moenchia erecta (*L.*) *Gaertn. Mey. et Scherb.* Flor. Wett. **1,** 219 (1799).

One hour's climb above Chilandari, 23.4.34, fruiting material collected as K.1452.

Distribution : Central Europe and Mediteranean Region ; Athos, Thrace, S. Bulgaria, Dalmatia, Istria.

M. mantica (*Torn.*) *Bartl.* Cat. sem. hort. Gött. 1839, 5, ex. Koch Syn. Flor. Germ. ed 2, 131 (1843).

Hills behind Pyrgos, 11.6.34, *Mrs Loch* no. 2 ; near Pyrgos, 24.4.34, stony ground, no. 2746.

Distribution : Mediterranean Region ; most districts of the Balkan Peninsula, but not Crete.

Polycarpon tetraphyllum *L.* Syst. ed. 10, 881 (1759) var. **diphyllum** (*Cav.*) *DC.* Prodr. **3,** 376 (1828).

Mulyani Islands : Pontiko Island, 15.4.34 dry stony places, no. 2388.

Distribution : Old World ; most districts of the Balkan Peninsula.

Silene colorata *Poir.* Voy. Barb. **2,** 163 (1789).

Mulyani Islands : second small island off Pyrgos, 15.4.34, dry stony places, no. 2389, and, collected *H. G. Chick,* 13.4.34, no. 2579 ; hill behind Pyrgos, 11.4.34, collected *H. G. Chick,* no. 2614.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, Corfu, Albania, Thrace.

S. Cucubalus *Wib.* Prim. Flor. Werth. 241 (1799).

Near Simopetra, 13.4.34, dry banks and stony ground, no. 2361, a rather tall loose form with straggling branches ; Athos peak, 12.7.34, 1960 m., rocky and stony places near summit of peak, *H. G. Tedd* no. 1493, a few-flowered variety or form with pigment in calyx, nearly white petals, and purple anthers.

Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

Silene Fabaria *S. et S.* Prodr. **1,** 293 (1806) et Flor. Graec. t. 415 (1825).

Mulyani Islands : Frying Pan Island, 5.6.34, *Mrs. Loch* no. 19 ; near Kapsokalývia, 19.4.34, dry limestone slopes, no. 2492 ; grown in the

Herbarium Ground, Kew, 21.9.35, as K. 1473, from seed collected south-east of the wall of the Holy Ground, 24.4.34.

Distribution: E. Mediterranean Basin; Greece, S. Macedonia, Athos Peninsula, Thrace.

Cucubalus Fabarius L. Sp. Pl. 414 (1753) is said to be from Sicily and, since *S. Fabaria* S. et S. (description and plate) is not recorded from Sicily, may be a variety of *S. Cucubalus* Wib. (see Fiori, Nuovo Flor. Anal. d.Ital. 485: 1924). If this be so the nomenclatural validity of the name *Silene Fabaria* comes into question. There is, however, no doubt of Sibthorp and Smith's botanical intention of denoting the species to which the name *S. Fabaria* is generally given and their name is therefore retained here.

S. gallica *L.* Sp. Pl. 417 (1753).

Hills behind Pyrgos, 6.34, *Mrs Loch* no. 23; Mulyani Islands: second small island off Pyrgos, 15.4.34, dry stony places, no. 2389; near Xerxes Canal, 17.4.34, cultivated fields, no. 2443.

Petals pink.

Distribution: now more or less cosmopolitan; widely spread in the Balkan Peninsula.

S. genistifolia *Hal.* in Oesterr. Bot. Zeitchr. **42,** 369 (1892).

Athos peak, 12.7.34, 1700 m., among rocks, *H. G. Tedd* no. 1489.

Stems slender with sticky excretion; petals white.

Distribution: probably endemic to Athos.

The original description of Halácsy is apparently inaccurate in giving the calyx length as 10–12 mm. Hayek's measurements of 18 to 23 mm. agrees with the material collected by Sintenis and Bornmüller, as well as with Tedd's specimens, but whether Hayek is correct in combining *S. genistifolia* Hal. with *S. macropoda* Vel. var. *media* Vel. in K. böhm. Ges Wiss. Prag 1902, 3 (separ.), from Belogradčik and Kostenec in Rila, Bulgaria, is uncertain.

S. italica (*L.*) *Pers.* Syn. **1,** 498 (1805).

Above Simopetra, 13.4.34, in brushwood, no. 2344; ravine in hills behind Pyrgos, 15.4.34, coll. *H. G. Chick*, no. 2652; south-east of Pyrgos, 24.4.34, no. 2714, flowers attacked by *Ustilago*.

Petals white.

Distribution: Central Europe, Mediterranean Region, Caucasus; general in the Balkan Peninsula.

Spergula arvensis *L.* Sp. Pl. 440 (1753) var. **laricina** (*Wulf*) *Aschers.* Flor. Brand. **1,** 93 (1864).

Between Pyrgos and Xerxes Canal, 17.4.34, sandy ground near shore, no. 2453.

Semi-prostrate, much branched from the base, whole plant glandular-pilose. There are only 6 to 7 stamens per flower and in some respects the plants verge towards *S. pentandra* L.

Distribution (of species): more or less cosmopolitan; widespread in the Balkan Peninsula.

Spergularia rubra (*L.*) *Pers.* Syn **1,** 504 (1805).

Panteleëmon, 14.4.34, between stones near the sea-shore, no. 2262.

Distribution: E. N. Temperate Region; widespread in the Balkan Peninsula.

S. salina *J. et C. Presl* Flor. Čech. 95 (1819).

Panteleëmon, 14.4.34, between stones near the sea-shore, no. 2261.

Distribution: now nearly cosmopolitan in temperate coastal regions; most coastal districts in the Balkan Peninsula.

Stellaria media (*L.*) *Vill.* Hist. Pl. Dauph. **3,** 615 (1789).

Between Panteleëmon and Karyes, 630 m., 14.4.34, damp places in *Castanea* wood, no. 2267, a plant with rather tall stems and large flowers with 3 to 4 stamens; between Simopetra and Karyes, 460 m., 13.4.34, in partial shade

of woods, no. 2331, a plant with the lower leaves long stalked and the stems, the upper leaves, and the sepals densely glandular hairy; either the var. *pubescens* Post Flor. Syr. 154 (1896) or approximating to this.

Distribution (of species): cosmopolitan; general in the Balkan Peninsula.

PORTULACACEAE.

Montia verna *Neck.* Del. Gallo-Belg. **1,** 78 (1768).

High above Simopetra, on the way to Karyes, 610 m., 13.4.34, in a small stream, no. 2318.

Distribution: N. Temperate Region; widespread in the Balkan Peninsula.

TAMARICACEAE.

Tamarix tetrandra *Pall.* in M. Bieb. Flor. Taur.-Cauc. **1,** 247 (1808).

Near Chilandari Arsenal, 22.4.34, in dry stream bed, no. 2684.

Very pale pink flowers.

Distribution: Oriental; Crete, Greece, S. Macedonia, Thrace, S. Bulgaria.

HYPERICACEAE.

Hypericum Montbretii *Spach* Hist. Nat. Veg. **5,** 395 (1836).

Simopetra, between the monastery and the arsenal, 13.4.34, dry stony ground, no. 2355.

Distribution: Balkan Peninsular type, east to Caucasus; N. and S. Macedonia, Athos, Thrace, N. and S. Bulgaria, Rodope Massif.

H. olympicum *L.* Sp. Pl. 784 (1753).

Mulyani Islands: Pontiko Island, 20.6.34, *Mrs. Loch* no. 34; Athos peak, 1540 m., *H. G. Tedd* no. 1521.

Distribution: E. Mediterranean Basin, east to Caucasus; Greece, Thesaly, N. and S. Macedonia, Athos Peninsula, Thrace, Thracian Islands, N. and S. Bulgaria, Rodope Massif.

H. perforatum *L.* Sp. Pl. 785 (1753) verging to var. **angustifolium** *DC.* Flor Fr. **5** (6), 630 (1815).

Pyrgos, 8.34, *Mrs. Loch* no. 30. A slender few-flowered form, possibly growing in the shade.

Distribution: E. N. Temperate Region; most districts of the Balkan Peninsula.

H. rhodoppeum *Friv.* in Flora **19,** 436 (1836).

High above Karyes, 13.4.34, more or less open spaces in shady woods, no. 2310; above Simopetra, 13.4.34, stony, more or less open places in macchia, no. 2326.

Glaucous leaves; large yellow flowers.

Distribution: Balkan Peninsular type extending to N. Asia Minor; N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif.

LINACEAE.

Linum angustifolium *Huds.* Flor. Angl. ed. 2, **1,** 134 (1778).

Near Kapsokalývia, 19.4.34, dry limestone slopes, no. 2476; Mulyani Islands: on small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, nos. 2597, 2610.

Distribution: W. Europe, Mediterranean Basin east to Caucasus, general in the Balkan Peninsula.

L. austriacum *L.* Sp. Pl. 278 (1753) subsp. **eu-austriacum** *Hayek*, Prodr. **1,** 566 (1925).

Athos peak, 1630–1970 m., 12.7.34, rocky places, *H. G. Tedd* no. 1497.

Petals bright azure blue.

Distribution: Pannonian and Mediterranean Regional, east to Caucasus; general in the Balkan Peninsula.

L. elegans *Sprun.* in Boiss. Diagn. **2,** 1, 99 (1854).
East of Kapsokalývia, 19.4.34, on crystalline limestone rock scree, on dry slopes above the sea, no. 2491.
Petals bright yellow.
Distribution : Balkan Peninsular type extending to N.W. Asia Minor ; Mediterranean districts of the Balkan Peninsula.

L. tenuifolium *L.* Sp. Pl. 278 (1753).
Athos peak, 1700–1970 m., 12.7.34, among rocks, *H. G. Tedd* no. 1496.
Petals light pink.
Distribution : Mediterranean Basin, east to Caucasus ; most districts of the Balkan Peninsula, but not Crete.

GERANIACEAE.

Erodium Botrys (*Cav.*) *Bertol.* Amoen. Ital. 35 (1819).
Mulyani Islands : small island off Pyrgos, 13.4.36, no. 2635.
Petals purplish.
Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, Corfu, S. Macedonia, Thrace.

E. ciconium (*Jusl.*) *Willd.* Sp. Pl. **3,** 629 (1801).
Cultivated, as K. 1480, in the Herbarium Ground, Kew, 20.6.35, 5.7.35, 13.7.35, from seeds collected on the Mulyani Islands : Pontiko Island, 25.4.34.
Distribution : Mediterranean Basin, east to Caucasus ; most districts of the Balkan Peninsula, but not Crete.

E. romanum (*L.*) *L'Hér.* in Ait. Hort. Kew. ed. 1, **2,** 414 (1789).
Between Pyrgos and Xerxes Canal, 17.4.34, on dry bare ground, no. 2448.
Sepals reticulately veined in the upper half, petals pale pink, pits of carpels with glands.
Distribution : Mediterranean Basin ; Greece, Cyclades, Thrace.

Geranium columbinum *L.* Sp. Pl. 682 (1753) var. **holopetalum** *Griseb.* Spic. **1,** 123 (1843).
Plateau between Chilandari and Pyrgos, 23.4.34, open places in macchie with *Pinus halepensis*, no. 2694.
Distribution (of species) : E. N. Temperate Region ; general in the Balkan Peninsula.

G. lucidum *L.* Sp. Pl. 682 (1753).
High above Lavra, on the slopes of Athos peak, 770 m., 20.4.34, in stony shady places in *Abies* zone, no. 2517.
Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

G. molle *L.* Sp. Pl. 682 (1753).
South-east of Pyrgos, 24.4.34, on bare ground, no. 2716.
Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

G. purpureum *Vill.* Hist. Pl. Dauph. **3,** 374, t. 40 (1789).
Near Simopetra, 13.4.34, grassy places, no. 2371.
Distribution : W. and parts of Central Europe, Mediterranean Region, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

G. Robertianum *L.* Sp. Pl. 681 (1753).
High above Lavra, on slopes of Athos Peak, 770 m., 20.4.34, stony ground in *Abies* forest, no. 2518 ; between Stavronikita and Pantokratoros, 21.4.34, damp spots in macchie, on mica-schist slopes, no. 2556.
Distribution : Central Europe, Mediterranean Region, Caucasus ; widespread in the Balkan Peninsula, but not in Crete.

G. rotundifolium *L.* Sp. Pl. 683 (1753).
Mulyani Islands : small island off Pyrgos, 13.4.34, no. 2638.
Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

Paliurus spina-Christi *Mill.* Gard. Dict. ed. 8 (1768).

Seedlings gown as K. 1471 in the Herbarium Ground, Kew, 19.7.35, from seeds collected between Pyrgos and Xerxes Canal, 17.4.34.

Distribution: Mediterranean Region, N. to Hungary and S. Tyrol and east to Caucasus; general in the Balkan Peninsula, but not in Crete.

Rhamnus Alaternus *L.* Sp. Pl. 193 (1753).

Simopetra, between the monastery and the arsenal, 13.4.34, in tall macchia, no. 2297; above Simopetra, 13.4.34, in macchia, no. 2333, small greenish flowers; above Zographu Arsenal, 16.4.34, in high macchia, no. 2409; south-east of Pyrgos, 24.4.34, Cistus-clad slopes above the sea, no. 2740, bushy shrub with reddish fruits.

Distribution: Mediterranean Basin; most Mediterranean districts of the Balkan Peninsula.

ACERACEAE.

Acer platanoides *L.* Sp. Pl. 1055 (1753).

High above Lavra on slopes of Athos peak, 830 m., 20.4.34, in high forest, groups of deciduous trees in *Abies* forest, no. 2529.

Distribution: Central Europe and E. Mediterranean Basin east to Caucasus; most districts of the Balkan Peninsula, but not Crete.

ANACARDIACEAE.

Pistacia Lentiscus *L.* Sp. Pl. 1026 (1753).

Head of Cassandra Gulf, 12.4.34, no. 2608.

Distribution: Mediterranean Basin; most Mediterranean districts of the Balkan Peninsula.

P. Terebinthus *L.* Sp. Pl. 1025 (1753).

Near Stavronikita, in flower 21.4.35, on dry mica-schist slopes, in macchia, no. 2559.

Distribution: Mediterranean Basin; most Mediterranean districts of the Balkan Peninsula.

LEGUMINOSAE.

Anthyllis Hermanniae *L.* Sp. Pl. 720 (1753).

Pyrgos, cliffs, 10.6.34, *Mrs. Loch* no. 12.

Height 9 to 10 inches.

Distribution: Mediterranean Basin; Crete, Greece, Cyclades, Epirus, Corfu, Albania, S. Macedonia, Athos Peninsula, Thrace, Thracian Islands, Montenegro.

A. montana *L.* Sp. Pl. 719 (1753).

Athos peak, 1940 m., 12.7.34, among rocks, *H. G. Tedd* no. 1517.

Flowers cream-white, becoming brown on withering.

Distribution: Mediterranean Basin; most Mediterranean and Transitional districts of the Balkan Peninsula, but not in Crete.

A. Vulneraria *L.* Sp. Pl. 719 (1753) subsp. **pulchella** (*Vis.*) *Bornm.* sensu Hayek Prodr. **1,** 888 (1926).

Athos peak, 1900 m., 12.7.34, among rocks near the summit, a few plants only, *H. G. Tedd* no. 1488.

Calyx reddish, corolla nearly white, musty red when withered.

Distribution (of species): general European and Mediterranean Basin east to Caucasus; general in the Balkan Peninsula.

Astragalus angustifolius *Lam.* Enc. **1,** 321 (1784) subsp. **pungens** (*Willd.*) *Hayek* Prodr. **1,** 790 (1926). *A. angustifolius* var. *bracteatus* Griseb. Spic. **1,** 57 (1843).

Athos peak, 1900–1970 m., among rocks, 12.7.34, *H. G. Tedd* no. 1511.

A cushion plant; the rhachis of the leaves hardens to a spine in the second year.

Distribution : (of species) : Balkan Peninsular type east to Asia Minor ; widely distributed in the Balkan Peninsula.

A. macedonicus *Heldr. et Nadji* in Nadji, Geogr. Bot. 19 (1892). *A. monspessulanus* L. var. *macedonicus* (Heldr. et Nadji) Hayek, Prodr. **1,** 787 (1926).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2423.

Distribution : Balkan Peninsular endemic ; N. and S. Macedonia, S. Bulgaria, Rodope Massif.

A. parnassi *Boiss.* Diagn. **1,** 9, 80 (1849).

Athos peak, 1700 m., 12.7.34, among rocks, *H. G. Tedd* no. 1526.

A cushion plant, rhachides of leaves hardening to spines, flowers bright red-pink.

Distribution : Balkan Peninsular endemic ; Greece, Thessaly, Epirus, N. and S. Macedonia, Athos Peninsula, Thracian Islands.

Biserrula pelecinus *L.* Sp. Pl. 762 (1753).

Mulyani Islands : 15.4.34. damp places in brushwood, no. 2391 ; a lush form with relatively long stems, large green leaves and mauve flowers. A remarkable contrast with no. 2680.

Near Chilandari, 22.4.34, sandy field near the sea, no. 2680 ; a low-growing form, densely hairy, with small leaflets.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, N. and S. Macedonia, Athos Peninsula, Thrace.

Calycotome villosa (*Poir.*) *Link* Enum. **2,** 225 (1822).

Simopetra, between the monastery and the arsenal, 13.4.34, no. 2285.

Yellow flowers with a sweet scent.

Distribution : Mediterranean Basin ; most Mediterranean districts of the Balkan Peninsula.

Cercis siliquastrum *L.* Sp. Pl. 374 (1753).

Above Panteleëmon, 14.4.34, in high macchia, no. 2266.

Distribution : Mediterranean Region ; most Mediterranean and Transitional districts of the Balkan Peninsula, but not Crete.

Coronilla cretica *L.* Sp. Pl. 743 (1753).

Near Kapsokalývia, 19.4.34, dry macchia slopes, no. 2497.

Flowers pink and few.

Distribution : E. Mediterranean Basin, Caucasus ; most Mediterranean and Transitional districts of the Balkan Peninsula.

C. emeroides *Boiss. et Sprun.* Diagn. **1,** 2, 100 (1843).

Ravine behind and to S.E. of Pyrgos, 14.4.34, coll. *H. G. Chick*, no. 2653.

See Uhrová in Beih. Bot. Centrlbl. **53,** 47 (1935) where *C. emeroides* is made a subspecies of *C. Emerus* L.

Distribution : Central Europe, Mediterranean Basin, Caucasus ; widespread in the Balkan Peninsula.

Cytisus hirsutus *L.* Sp. Pl. 739 (1753) s.l. var.

Above Simopetra, 13.4.34, no. 2314.

The petals are yellow and the vexillum is hairy on the back along the middle line.

Distribution : E. N. Temperate Region ; widespread in the Balkan Peninsula, not in Crete.

C. triflorus *L.Hér.* Stirp. 184 (1784).

Between Simopetra and Karyes, 400 m., 13.4.34, in woods, no. 2324.

Distribution : Mediterranean Basin ; Greece, Thessaly, Corfu, Albania, Athos Peninsula, Thrace.

Dorycnium graecum (*L.*) *Ser.* in DC. Prodr. **2,** 208 (1825).

Plateau between Chilandari and Pyrgos, 23.4.34, in macchia under *Pinus halepensis*, no. 2693.

White petals.

Distribution : Pontic and Caucasian type ; Greece, Thessaly, S. Macedonia, Athos Peninsula, Thrace, N. Bulgaria.

Genista tinctoria *L.* Sp. Pl. 710 (1753).

High above Simopetra, 610 m., 13.4.34, in woods, no. 2317 ; Sithonia (Longos) Peninsula, near Armisti, 19.6.34, coll. *H. G. Chick and H. G. Tedd*, no. 2648.

The lateral nerves of the leaves are inconspicuous and in the absence of fruiting material the identification is not quite certain.

Distribution : General European east to Caucasus ; most districts of the Balkan Peninsula, except the southernmost.

Hymenocarpus circinnatus (*L.*) *Savi* Flor. Pis. **2**, 205 (1798).

Near Zographu Monastery, 16.4.34, stony places in macchia, no. 2413.

Distribution : Mediterranean Region ; general in the Mediterranean districts of the Balkan Peninsula.

Lathyrus Aphaca *L.* Sp. Pl. 729 (1753).

Near Xerxes Canal, 17.4.34, in cultivated fields, no. 2433, flowers rather large, petals very pale creamy white ; above the Roumanian Prodromos skete, near the point of the Peninsula, 19.4.35, dry bushy slopes in macchia, not on limestone, no. 2495, flowers rather small, petals bright yellow.

Two markedly distinct varieties. The intraspecific variation of this species requires re-investigation.

Distribution : W. Europe, Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

L. Cicera *L.* Sp. Pl. 730 (1753).

Head of Cassandra Gulf, Chalkidike Peninsula, 12.4.34, no. 2630.

A more hairy plant than usual in the species, with narrow leaflets.

Distribution : Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

L. digitatus (*M. Bieb.*) *Fiori* in Fiori e Paoletti, Flor. Anal. d'Ital. **2**, 105 (1899) ; *Orobus digitatus* M. Bieb. Flor. Taur.-Cauc. **2**, 153 (1808) ; *O. sessilifolius* S. et S. Prodr. **2**, 64 (1813) et Flor. Graec. t. 692 (1830) ; *Lathyrus sessilifolius* (S. et S.) Ten. Flor. Neap. Prodr. App. **5**, 20 (1826).

Above Simopetra, 13.4.34, dry stony and bushy ground, no. 2342.

A variety with long narrow leaflets, long inflorescences, and large deep wine-purple flowers. Probably the var. *longiflorus* Čel. in Sitz. k. böhm. Ges. Wiss. Prag. 1887, 528 (under *L. sessilifolius*).

Distribution : E. Mediterranean Basin and Pontic ; southern and eastern districts of the Balkan Peninsula, but not in Crete.

L. sativus *L.* Sp. Pl. 730 (1753).

S.E. of Pyrgos, in ravine, 15.4.34, coll. *H. G. Chick*. no. 2607.

Distribution : E.N. Temperate Region ; widespread in the Balkan Peninsula.

L. venetus (*Mill.*) *Wohlf.* in Hallier et Wohlf. ed. Koch Syn. ed. 3, 714 (1892) ; *Orobus venetus* Mill. Gard Dict. ed. 8 (1768).

High above Simopetra, on way to Karyes, 14.4.34, semi-shady places in woods, no. 2303.

Purple flowers.

Distribution : Mediterranean Basin ; most districts of the Balkan Peninsula, but not Crete or the Dobruja.

Lotus edulis *L.* Sp. Pl. 774 (1753).

Above Pyrgos, 25.4.34, on *Cistus*-clad granite slopes, no. 2752.

Corolla pale yellow.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, Corfu, Thrace, Dalmatia.

L. peregrinus *L.* Sp. Pl. 774 (1753).

South-east of Pyrgos, in ravine, 15.4.34, coll. *H. G. Chick*, no. 2606.

Distribution : E. Mediterranean Basin ; Crete, Greece, Cyclades, Montenegro.

Lupinus angustifolius *L.* Sp. Pl. 721 (1753).

Simopetra, between the arsenal and the monastery, 13.4.34, stony open places in macchia, no. 2292; Mulyani Islands : small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2625.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, N. and S. Macedonia, Thrace.

L. Termis *Forsk.* Flor. Aeg. 131 (1775).

Near Stavronikita, towards Pantokratoros, 21.4.34, bare ground in olive-groves on mica-schist slopes, no. 2549.

Distribution : E. Mediterranean Basin ; here and there in several districts of the Balkan Peninsula, but often (? always) as an escape from or weed of cultivation.

Medicago hispida *Gaertn.* De fruct. **2,** 349 (1791) var. **denticulata** (*Willd.*) *Urb.* App. ind. hort. Berol. 1872, 3.

South of Pyrgos, 24.4.34, bare stony ground, no. 2735.

Distribution (of species) : E.N. Temperate Region ; most districts of the Balkan Peninsula.

M. littoralis *Rohde* in Lois. Not. 118 (1810) var. **longiseta** *DC.* Flor. Franc. **5** (6), 568 (1815).

Between Pyrgos and Xerxes Canal, 17.4.34, on blown sand among rocks, no. 2439 ; south of Pyrgos, 24.4.34, bare sandy ground, no. 2737.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, Corfu, Thrace, Montenegro, Dalmatia, Istria.

M. marina *L.* Sp. Pl. 779 (1753).

Pyrgos district, towards Xerxes Canal, 17.4.34, sandy sea shore, no. 2455 ; Mulyani Islands : small island off Pyrgos, 22.4.34, slopes near the sea, no. 2651.

Distribution : Mediterranean Basin, east to Caucasus ; most coastal districts of the Balkan Peninsula.

M. tribuloides *Desr.* in Lam. Enc. **3,** 635 (1791).

South of Pyrgos, 24.4.34, bare sandy ground, no. 2736.

Distribution : Mediterranean Region ; most Mediterranean and Transitional districts of the Balkan Peninsula.

Melilotus neapolitanus *Ten.* ex Guss. Flor. Sic. Prodr. **2,** 482 (1828).

South of Pyrgos, 24.4.34, bare places on sandstone slopes with *Cistus*, etc., no. 2720.

Distribution : Mediterranean Region, Caucasus ; most Mediterranean and Transitional districts of the Balkan Peninsula.

Onobrychis Caput-galli (*L.*) *Lam.* Flor. Fr. **2,** 651 (1778).

South of Pyrgos, 24.4.34, bare sandy ground near the sea, no. 2731.

Distribution : Mediterranean Basin east to Caucasus ; most Mediterranean and Transitional districts of the Balkan Peninsula.

Ornithopus compressus *L.* Sp. Pl. 744 (1753).

Above Simopetra, 310 m., 13.4.34, stony ground, no. 2335.

Distribution : Mediterranean Basin, east to Caucasus ; fairly widespread in the Balkan Peninsula.

O. pinnatus (*Mill.*) *Druce* in Journ. Bot. **45,** 420 (1907).

Mulyani Islands : small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2634.

Distribution : Mediterranean Basin ; Greece, Cyclades, Athos Peninsula.

Pisum elatius *Stev.* in M. Bieb. Flor. Taur.-Cauc. **2,** 151 (1808).

Simopetra, between the arsenal and the monastery, 13.4.34, dry ground, no. 2353 ; Mulyani Islands : 15.4.34, in brushwood, no. 2390, standard mauve, keel and wings blackish purple.

Distribution : E. N. Temperate Region ; Greece, Corfu, N. and S. Macedonia, Athos Peninsula, N. Bulgaria, Rodope Massif, Serbia, Montenegro, Dalmatia, Istria.

The relationships between *P. arvense* L. and *P. elatius* Stev. require further investigation.

Psoralea bituminosa *L.* Sp. Pl. 763 (1753) var. **ovata** (*Rouy* in Rouy et Fouc. Flor. Fr. **5,** 131 : 1899 as sub-var.).

South of Pyrgos, 24.4.34, bare places on slopes with *Cistus* bushes, facing sea, no. 2717.

Distribution : Mediterranean Region, Caucasus ; most Mediterranean and Transitional districts of the Balkan Peninsula.

Trifolium arvense *L.* Sp. Pl. 769 (1753).

South of Pyrgos, 24.4.34, bare places on *Cistus*-clad slopes facing the sea, no. 2728.

Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

T. campestre *Schreb.* in Sturm. Deutschl. Flor. 16 (1804).

South of Pyrgos, 24.4.34, bare stony ground, no. 2715.

Distribution : General European, Mediterranean Basin, east to Caucasus ; general in the Balkan Peninsula.

T. dolopi(c)um *Heldr. et Hausskn.* ap. Gib. et Belli in Malpighia **3,** 228 (1889).

Above Chilandari, 23.4.34, in macchia on decomposing granite, no. 2699. Flowers golden-yellow.

Distribution : Thessaly, Thrace.

This species was published, with a description, by Haussknecht (Mitt. Thur. Bot. Ver. N.F. **5,** 78 : 1893) as *T. patens* Schreb. var. *Koronense.* The material on which this description was based was collected by Haussknecht in Thessaly : " in schistosis pr. mon. Korona." The Athos plants agree well with this description in all characters. Gibelli and Belli (l.c.) suggest that the original material of Heldreich may have resulted from a cross between *T. patens* Schreb. and *T. mesogitanum* Boiss. This is most unlikely and it seems certain that *T. dolopicum* has to be accepted as a good species with a discontinuous distribution in countries around the northern part of the Aegean Sea. It has not improbably arisen mutationally from the more widely distributed *T. patens* Schreb.

Davidoff (in Trud. Balg. Prirod. Drus. **8,** 70 : 1915, p. 28 of separate) records the species from Western Thrace, in a meadow near Gumaldschina.

There is some difficulty in applying the name *T. dolopicum.* Halácsy, Consp. Flor. Graec. **1,** 405 (1900), quotes it as " *T. dolopicum* Heldr. et Hausskn, in Heldr. it. iv. per Thessal. a. 1885." Gibelli and Belli (l.c.) give it as "*T. dolopium* Heldr. et Hochst." Both Halácsy and Gibelli quote Heldreich (not Haussknecht) as the collector of the type material.

T. glomeratum *L.* Sp. Pl. 770 (1753).

Near Pyrgos, 25.4.34, dry stony ground, no. 2757.

Distribution : W. Europe, Mediterranean Basin east to the Caucasus ; widespread in the Balkan Peninsula.

T. nigrescens *Viv.* Flor. Ital. fragm. 12, t. 13 (1808).

South-east of Pyrgos, 24.4.34, sandy fields by the sea, no. 2730.

Distribution : Mediterranean Basin ; most districts of the Balkan Peninsula.

Trifolium radiosum *Wahlenb.* in Berggr. Resor. Eur. **2,** Bih. 43 (1826). *T. nidificum* Griseb. Spic. **1,** 32 (1843).

South-east of Pyrgos, 24.4.34, bare sandy ground, no. 2732. Flowers pinkish-cream.

Distribution : E. Mediterranean Basin ; Greece, S. Macedonia, Athos Peninsula, Thrace.

T. scabrum *L.* Sp. Pl. 770 (1753).

South-east of Pyrgos, 24.4.34, bare sandy ground, no. 2733.

Petals pink. The calyx segments are somewhat shorter and broader than the average for the species.

Distribution: W. Europe, Mediterranean Basin east to the Caucasus; most districts of the Balkan Peninsula.

T. stellatum *L.* Sp. Pl. 769 (1753).

Near Zographu Monastery, 16.4.34, stony ground at path side, no. 2410.

Distribution: Central Europe, Mediterranean Region; most Mediterranean and Transitional districts of the Balkan Peninsula.

T. subterraneum *L.* Sp. Pl. 767 (1753).

Above Simopetra, 13.4.34, dry stony places on banks, no. 2367.

White petals.

Distribution: Central Europe, Mediterranean Region, Caucasus; general in the Balkan Peninsula.

T. tomentosum *L.* Sp. Pl. 771 (1753).

South-east of Pyrgos, 24.4.34, bare sandy ground, no. 2734.

Distribution: Mediterranean Region; most Mediterranean and Transitional districts of the Balkan Peninsula.

T. uniflorum *L.* Sp. Pl. 771 (1753).

High above Simopetra, 13.4.34, on stony ground, no. 2316.

Corollas white. Plants forming flat cushions.

Distribution: Mediterranean Basin; Crete, Greece, Cyclades, S. Macedonia, Athos Peninsula, Thrace, Thracian Islands, Dalmatia.

A variety with pale glabrous calyx-tubes and rather large white petals. In Hayek's Prod. **1,** 856 (1926) it comes under var. *cryptoscias* (Griseb.) Gib. et Belli, but the flowers are decidedly larger than those of Grisebach's material at Kew.

Vicia angustifolia *Reich.* Flor. Moen. Frankf. **2,** 44 (1778).

Near Chilandari, 22.4.34, sandy fields near the sea, no. 2682A.

Flowers purple. One of the numerous varieties or forms of this species with the leaflets of the upper leaves long acuminate.

Distribution: General European, Mediterranean Basin east to Caucasus; most districts of the Balkan Peninsula.

V. Barbazitae *Ten. et Guss.* Mem. peregr. 1838, 165.

High above Simopetra, on the ridge on the way to Karyes, 13.4.34, no. 2320.

Standards cream, wings violet, keel very short.

Distribution: S. European; Greece, Thessaly, N. and S. Macedonia, Athos Peninsula, S. Bulgaria.

The above reference has not been seen but the description in Ann. Sci. Nat. sér. 2, **13**, 381 (1840) has been consulted.

V. bithynica *L.* Syst. ed. 10, 1166 (1759).

Near Chilandari, 22.4.34, sandy field near the sea, among bushes, no. 2681.

Standards pale mauve, keel and wings nearly white.

Distribution: Mediterranean Basin east to the Caucasus; most Mediterranean and Transitional districts of the Balkan Peninsula.

V. dasycarpa *Ten.* Viagg. Abruzz. 81 (1829) n.v.; Flor. Nap. **5,** 116, t. 244 (1835–36).

Mulyani Islands: small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2637.

Distribution: Mediterranean Basin; most districts of the Balkan Peninsula.

There does not seem to be a very sharp line of distinction between *V. villosa* Roth and *V. dasycarpa* Ten. No. 2637 has rather long and relatively narrow leaflets and the calyx characters of *V. dasycarpa*. The leaves and stems are hairy, though not densely so.

V. grandiflora *Scop.* Flor. Carn. ed. 2, **2,** 65, t. 42 (1772). var. **Kitaibeliana** *Koch* Syn. 197 (1835).

Above Simopetra, 13.4.34, no. 2343.

Pale yellow corollas, turning to a brownish colour with age.

Distribution (of species) : Central Europe, Italy, E. Mediterranean Basin east to the Caucasus ; widespread in the Balkan Peninsula, but not from Crete.

V. lathyroides *L.* Sp. Pl. 736 (1753).

Asbestochori Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2588 ; above Pyrgos, 25.4.34, grassy spot on granitic slopes, no. 2755.

Distribution : General European, Mediterranean Basin east to the Caucasus ; widespread in the Balkan Peninsula.

V. monanthos (*L.*) *Desf.* Flor. Atl. **2,** 165 (1798).

Above Simopetra, 13.4.34, on dry stony bank, no. 2341.

Pale blue corollas with darker veins on standards.

Distribution : Mediterranean Basin ; Greece, Cyclades, Thessaly, S. Macedonia, Dalmatia.

V. pubescens (*DC.*) *Link* Handb. **2,** 190 (1831).

S. E. of Pyrgos, in ravine, 14.4.34, coll. *H. G. Chick*, no. 2602.

Pale bluish corollas.

Distribution : Mediterranean Basin ; Crete, Greece, S. Macedonia, Rodope Massif, Montenegro, Dalmatia, Istria.

V. sativa *L.* Sp. Pl. 736 (1753) subsp. **notata** (*Gilib.*) *Aschers. et. Graebn.* Syn. Flor. Mitt.-Eur. **6,** 2, 963 (1909).

Near Chilandari, 22.4.34, sandy fields near the sea, no. 2682.

Purple corollas.

Distribution (of species) : General European, Mediterranean Region, Caucasus : general in the Balkan Peninsula.

V. villosa *Roth* Tent. Flor. Germ. **2,** 2, 182 (1793).

Simopetra, between the monastery and the arsenal, 13.4.34, amongst brushwood, no. 2357.

Deep violet-mauve corollas ; rather large leaflets.

Distribution : General European, Mediterranean Region, Caucasus ; most districts of the Balkan Peninsula, but not Crete.

ROSACEAE

Aremonia Agrimonoides (*L.*) *DC.* Prodr. **2,** 588 (1825).

Above Lavra, on slopes of Athos peak, 20.4.34, in stony shady places, no. 2519.

Distribution : S.E. Central Europe, Mediterranean Basin east to Caucasus, general in the Balkan Peninsula, but not in Crete.

Crataegus monogyna *Jacq.* Flor. Austr. **3,** 50, t. 292, fig. 1 (1775).

Above the Roumanian Prodromos Skete, 19.4.34, dry slopes in macchia, not on limestone, no. 2493.

Distribution : General European, Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

Fragaria vesca *L.* Sp. Pl. 494 (1753) ?

Above Simopetra, 13.4.34, no. 2338.

Pink sepals show between white petals.

Distribution : E.N. Temperate Region ; general in the Balkan Peninsula, but not in Crete.

The hairs on the pedicels are spreading to sub-spreading and in this respect the specimens are intermediate between *F. vesca* L. and *F. moschata* Duch. (*F. elatior* Ehrh.).

Potentilla geoides *M. Bieb.* Flor. Taur.-Cauc. **1,** 404 (1808).

High above Lavra, 800 m., on slopes of Athos peak, 20.4.34, shady places in *Abies* forest, no. 2528. Pale yellow petals.

Distribution : Dacian, Crimean, and Caucasian ; Rodope Massif.

The material is young and the differences between *P. geoides* and some of the numerous varieties of *P. rupestris* L. (sensu Th. Wolf in Bibl. Bot. **16,** 124 : 1908) are none too clear. The flowers of our Athos material are rather smaller and the leaf-cutting is rather less deep than in the Crimean and Caucasian specimens of *P. geoides* at Kew. On the other hand, the shorter, pale yellow, not white, petals, the longer styles, and the more erect, less open and spreading, flower parts, all point to *P. geoides* and not to *P. rupestris*.

P. reptans *L.* Sp. Pl. 499 (1753).

Hills behind Pyrgos, 3.5.34, *Mrs. Loch* no. 4.

Distribution : E.N. Temperate Region ; general in the Balkan Peninsula.

Poterium spinosum *L.* Sp. Pl. 994 (1753).

Between Pyrgos and Xerxes Canal, 17.4.34, locally dominant in phrygana on slopes to the south-east of the Canal, forming rounded cushions, no. 2457 ; cultivated in the Herbarium Ground, Kew, 1935–36, as K. 1543, from seed collected near Vatopedi, 11.7.34, *H. G. Tedd.* At Kew the species suffered in the winter and early spring frosts, but 5 out of 12 plants survived, forming much dark green foliage in the spring and large bushes in the summer of 1936, but not flowering.

Distribution : Mediterranean Basin ; general in the Mediterranean and Transitional districts of the Balkan Peninsula.

Sorbus torminalis (*L.*) *Cr.* Stirp. Austr. **2,** 45 (1763).

Above Lavra, 20.4.34, in high macchia, no. 2533.

Distribution : Central Europe and Mediterranean Basin east to the Caucasus ; widespread in the Balkan Peninsula, but not in Crete.

Saxifragaceae

Saxifraga hederacea *L.* Sp. Pl. 405 (1753).

Below Zographu Monastery, 16.4.34, on damp wall in shade, no. 2417.

Plants growing in clumps, with small white petals.

Distribution : E. Mediterranean Basin ; Crete, Greece, S. Macedonia, Athos Peninsula, Dalmatia.

S. rotundifolia *L.* Sp. Pl. 403 (1753) var. **hirsuta** *Sternb.* Rev. Saxifr. Suppl. **2,** 16 (1831).

High above Simopetra, on the ridge on the way to Karyes, 740 m., 13.4.34, amongst rocks in the woods, no. 2315 ; near Iviron, 20.4.34, shady stream bank, no. 2547.

Petals white, with more or less marked red spots.

Distribution (of species) : Central Europe and E. Mediterranean Basin ; widespread in the Balkan Peninsula, but not in Crete.

S. sancta *Griseb.* Spic. Flor. Bithyn. et Rumel. **1,** 333 (1843).

Mt. Athos peak, 1900 m., 12.7.34, crevices in limestone rocks, *H. G. Tedd.* s.n.

Distribution : Athos and N.W. Asia Minor.

S. tridactylites *L.* Sp. Pl. 404 (1753).

Cultivated in the Herbarium Ground, Kew, 26.6.35 and 6.5.36 as K. 1479, from seed collected on a wall near Chilandari, 22.4.34.

Distribution : N. Temperate Region ; widespread in the Balkan Peninsula.

Crassulaceae

Cotyledon pendulinus (*DC.*) *Batt.* in Batt. et Trab. Flor Algér. 329 (1889). *Umbilicus pendulinus* DC. Plant. Grass. t. 162 (1799–1829).

Simopetra, just above the arsenal, 13.4.34, stony places, no. 2363 ; hills behind Pyrgos, 15.6.34, *Mrs. Loch* no. 5.

Distribution : W. Europe and Mediterranean Basin ; fairly widespread in the Balkan Peninsula.

Sedum glaucum *W. et K.* Pl. Hung. **2,** 198 t. 181 (1805) var. **Buxbaumii** (Griseb.) Hayek Prodr. **1,** 629 (1925).

Below Zographu Monastery, 16.4.34 on stony and rocky ground in macchia, no. 2422.

Petals white with pink veins.

Distribution (of species) : Central Europe, Mediterranean Region, Caucasus ; general in the Balkan Peninsula, but not in Crete.

S. Grisebachii *Heldr.* in Boiss. Diagn. **2,** ii. 61 (1856). *S. annuum* L. var. *racemiferum* Griseb. Spic. **1,** 325 (1843).

Hills behind Pyrgos, June 1934, *Mrs. Loch* no. 22.

Distribution : Balkan Peninsular type, east to Bithynia ; Greece, Thessaly, N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif, Dalmatia.

This species is very near to *S. annuum* L. The best differential character appears to be the longer, narrower, and more acuminate petals.

S. litoreum *Guss.* Pl. Rar. 185, t. 37 (1826).

Chilandari, 22.4.34, on walls, no. 2672.

Pale dirty yellow-coloured petals ; 10 stamens.

Distribution : E. Mediterranean Basin ; Crete, Greece, Cyclades, Thessaly, S. Macedonia, Montenegro.

S. ochroleucum *Chaix* ap. Vill. Hist. Pl. Dauph. **1,** 325 (1786). *S. anopetalum* DC. Mém. Soc. Agr. Par. **11,** 12, n. v. ; Rapports Voyages **2,** 80 (1808).

Near summit of Mt. Athos, 1600–1800 m., 12.7.34, rocky slopes and rock crevices, *H. G. Tedd* s.n.

Distribution : Central Europe and Mediterranean Basin ; fairly widespread in the Balkan Peninsula.

Praeger, "An account of the genus Sedum as found in cultivation," in Journ. Roy. Hort. Soc. **46,** 273 (1921), without any clear reason uses the name *S. anopetalum* DC.

Sempervivum marmoreum *Griseb.* Spic. **1,** 329 (1843).

Near the summit of Mt. Athos, 1600-1900 m., on rough rocky slopes and rock crevices, *H. G. Tedd,* s.n.

Distribution : Dacian and Pannonian ; widely spread in the Balkan Peninsula, but not in Crete.

This is excellent material of the species from the type locality. The name antedates *S. Schlehanii* Schott in Oesterr. Bot. Wochenblatt **3,** 12 (1853). See Preager, An account of the Sempervivum Group, 59 (1932) and Turrill in Bull. Soc. Bot. Bulg. **7,** 124, 1936.

Tillaea muscosa *L.* Sp. Pl. 129 (1753).

Mulyani Islands : Pontiko Island, 15.4.34, in dry stony places, no. 2385.

Distribution : Central Europe and Mediterranean Basin ; Crete, Greece, Cyclades, S. Macedonia, Thrace, N. Bulgaria.

Myrtaceae.

Myrtus communis *L.* Sp. Pl. 471 (1753).

Between Lavra and its arsenal, 20.4.34, in high macchia, no. 2510 ; Sithonia (Longos) Peninsula, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd,* no. 2644.

Distribution : Mediterranean Region ; Mediterranean districts of the Balkan Peninsula.

Umbelliferae.

Cnidium silaifolium (*Jacq.*) *Simk.* Enum. Flor. Transs. 259 (1886).

Mt. Athos peak, 1550–1900 m., 12.7.34, rocky places, *H. G. Tedd,* no. 1523.

Flowers white ; plants about 2 feet high.

Distribution : Central and S. Europe ; fairly widespread in the Balkan Peninsula.

Crithmum maritimum *L.* Sp. Pl. 246 (1753).

Mulyani Islands : small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2641.

Distribution : Western Europe, Mediterranean Basin, east to the Caucasus ; general in the coastal districts of the Balkan Peninsula.

Ferulago monticola *Boiss. et Heldr.* in Boiss. Diagn. **2,** ii. 91 (1856).

Near Xenophontos, 18.4.34, stony bare ground in olive-groves, no. 2467.

The leaves on the stem are vertically adpressed. Flowers yellow. The specimens are young and the identification is not quite certain. See Turrill in Kew Bull. 1924, 338.

Distribution : Balkan Peninsular endemic ; fairly widely spread in N. Greece and in the central districts of the Balkan Peninsula.

Pimpinella Tragium *Vill.* Hist. Pl. Dauph. **2,** 605 (1787).

Athos peak, above Panaghia, 1700–1900 m., 12.7.34, rocky places, *H. G. Tedd* no. 1530.

White flowers.

Distribution : Mediterranean Region and the Caucasus ; widespread in the Balkan Peninsula.

Scandix Pecten-Veneris *L.* Sp. Pl. 256 (1753).

S.E. of Pyrgos, 15.4.34, in a ravine, coll. *H. G. Chick*, no. 2605.

Distribution : Central Europe and Mediterranean Basin east to Caucasus ; general in the Balkan Peninsula.

Smyrnium Orphanidis *Boiss.* Flor. Or. **2,** 925 (1872).

Kapsokalývia, 19.4.34, among stones on hot dry slopes, no. 2473.

Distribution : Balkan Peninsular type, east to the Troad ; Greece, Cyclades, S. Macedonia, Athos Peninsula.

Torilis arvensis (*Huds.*) *Lk.* Enum. **1,** 265 (1821) var **purpurea** (*Ten.*) *Hal.* Consp. **1,** 629 (1901).

South of Pyrgos, 24.4.34, in bare sandy ground above the sea, no. 2741.

Distribution (of species) : General European and Mediterranean Basin ; general in the Balkan Peninsula.

This plant was accepted as a distinct species by Tenore and by Gussone. Hayek (Prodr. **1,** 1057 : 1927) makes it a subspecies of equal rank with subsp. *eu-arvensis* and subsp. *neglecta*. The species (s.l.) would repay detailed investigation.

Caprifoliaceae.

Lonicera etrusca *Santi* Viagg. **1,** 113, t. 1 (1795).

Mulyani Islands : Frying Pan Island, 5.6.34, *Mrs. Loch* no. 17 ; Mt. Athos peak, Panaghia, 1550 m., 12.7.34, on rocky slopes and scree, *H. G. Tedd* no. 1504. A straggling bush about 2 ft. high with yellow flowers.

Distribution : Mediterranean Basin ; widespread in the Balkan Peninsula.

Rubiaceae.

Asperula athoa *Boiss.* Diagn. **1,** x. 62 (1849).

Mt. Athos peak, 1700–1970 m., in tufts in crevices of limestone rock, *H. G. Tedd* no. 1485.

Corollas chocolate-coloured.

Distribution : endemic to Athos.

Crucianella latifolia *L.* Sp. Pl. 109 (1753) var. **monspeliaca** (*L.*) *DC.* Prodr. **4,** 586 (1830).

South of Pyrgos, 24.4.34, bare places on *Cistus*-clad slopes facing the sea, no. 2727.

Distribution (of species) : Mediterranean Basin east to the Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

Galium asparagifolium *Boiss. et Heldr* in Boiss. Diagn. **2,** vi. 91 (1859).

Mt. Athos peak, Panaghia, 12.7.34, 1700 m., in rock crevices and among rocks and stones, *H. G. Tedd* no. 1506.

Flowers yellow.

Distribution : Greece.

This species was originally described from Mt. Parnassus, near Rachova and Gourna. It was reduced by Halácsy (Consp. **1,** 713 : 1901) to a variety of *G. scabrifolium* (Boiss.) Hausskn. and by Hayek (Prodr. **2,** 464 : 1930) to a variety of *G. firmum* Tausch.

G. Cruciata (*L.*) *Scop.* Flor. Carn. ed. 2, **1,** 100 (1772).

Asbestochori Cemetery, N. of Salonika, 11.4.34, no. 2590.

Yellow corollas.

Distribution : E.N. Temperate Region ; general in the Balkan Peninsula, but not in Crete.

G. murale (*L.*) *All.* Flor. Pedem. **1,** 8, t. 77, f. 1 (1785).

Near Chilandari, 22.4.34, on walls, no. 2669.

Distribution : Mediterranean Basin, widespread in the Mediterranean and Transitional districts of the Balkan Peninsula.

Rubia Olivieri *Rich.* Mem. Soc. Nat. Par. **5,** 132 (1834).

Near Kapsokalývia, 19.4.34, bushy limestone slopes, no. 2483.

Leaves thick and broad.

Distribution : E. Mediterranean Basin ; Crete, Greece, Thrace.

Sherardia arvensis *L.* Sp. Pl. 102 (1753).

Mulyani Islands : 15.4.34, dry stony places, no. 2384.

Distribution : Central Europe and Mediterranean Region ; general in the Balkan Peninsula.

VALERIANACEAE.

Kentranthus ruber (*L.*) *DC.* Flor. Fr. **4,** 239 (1805).

Mt. Athos peak, Panaghia, 1550 m., on rocky scree, *H. G. Tedd* no. 1505.

Flowers bright pink-red ; plant about 1–2 ft. high.

Distribution : Mediterranean Basin ; Mediterranean districts of the Balkan Peninsula.

Valeriana Dioscoridis *S. et S.* Prodr. **1,** 21 (1806).

Simopetra, between the arsenal and the monastery, 13.4.34, in brushwood, no. 2356.

White corollas.

Distribution : Oriental ; Greece, Thessaly, Albania, N. and S. Macedonia, Athos Peninsula, Montenegro.

Valerianella carinata *Lois.* Not. 149 (1810).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2418.

Distribution : General European and Mediterranean Region, widespread in the Balkan Peninsula.

DIPSACACEAE.

Pterocephalus perennis (*L.*) *Coult.* Mem. Dips. 33 (1823).

Mt. Athos peak, Panaghia and upwards, 1550–1700 m., 12.7.34, rocks and stony places, usually in rock crevices, *H. G. Tedd* no. 1508.

Flowers pale pink.

Distribution : Balkan Peninsular endemic ; Greece, Thessaly, Epirus, Albania, Athos Peninsula.

Scabiosa Webbiana *Don* in Bot. Reg. t. 717 (1823).

Mt. Athos peak, above Panaghia, 1700 m., 12.7.34, rocky places, *H. G. Tedd* no. 1529.

Flowers white.

Distribution : E. Mediterranean Region ; Greece, Thessaly, Epirus, N. and S. Macedonia, Athos Peninsula, Thrace, Serbia, Montenegro.

COMPOSITAE.

Andryala dentata *S. et S.* Prodr. **2,** 140 (1813).

South of Pyrgos, 24.4.34, in sandy ground and among boulders by the sea, no. 2739.

Greyish softly glandular and floccose plants ; florets lemon-yellow.

Distribution : Italy, Sicily, and E. Mediterranean Basin ; Greece, Cyclades, Athos Peninsula.

Anthemis Sibithorpii *Griseb.* Spic. **2,** 210 (1844).

Mt. Athos peak, 1970 m., 12.7.34, rock crevices at the summit, only one specimen accessible, *H. G. Tedd* no. 1494.

The plant has a pungent odour ; florets yellow.

Distribution : Athos endemic.

A. tomentosa *L.* Sp. Pl. 893 (1753) subsp. **peregrina** (*L.*) *Hayek* Prodr. **2,** 630 (1931).

Mulyani Islands : Pontiko Island, 15.4.34, sandy and rocky ground above the sea, no. 2400, and cultivated in the Herbarium Ground, Kew, 13.7.35, from the same locality, as K. 1494 ; Lavra, rocky ground by the arsenal, 20.4.34, no. 2531.

Leaves rather fleshy. White ray and yellow disc florets.

Distribution (of species) : E. Mediterranean Basin ; Greece, Corfu, S. Macedonia, Thrace.

Bellis hybrida *Ten.* Syll. 436 (1831).

Below Lavra, 20.4.34, side of path, n. 2530.

Distribution : S. Europe ; Crete, Greece, Thessaly, Corfu, N. and S. Macedonia, Thrace.

Calendula arvensis *L.* Sp. Pl. ed. 2, 1303 (1763).

Simopetra, above the arsenal, 13.4.34, in open stony places, no. 2364 ; Mulyani Islands : small island off Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2596.

Distribution : Mediterranean Region ; Mediterranean and Transitional districts of the Balkan Peninsula.

Carduus armatus *Boiss. et Heldr.* in Boiss. Diagn. **1,** vi. 104 (1845).

Mt. Athos peak, 1900 m., 12.7.34, rocks, *H. G. Tedd* no. 1572.

Plant about 1 ft. high ; florets pink to red.

Distribution : Balkan Peninsular endemic ; Greece, Thessaly, Epirus, Albania, N. Macedonia, Athos Peninsula, Thracian Islands, Rodope Massif.

The Athos plant is more nearly glabrous than most material from other districts. Halácsy's varietal epithet, in Herb. Kew. as *C. cronius* Boiss. et Heldr. var. *glabratus* Hal. does not appear to have been published.

C. pycnocephalus *L.* Sp. Pl. ed. 2, 1151 (1763).

Stavronikita, near the monastery, 21.4.34, bare rocky slopes, no. 2560.

Flowers pink.

Distribution : Central Europe, Mediterranean Region, Caucasus ; widespread in the Balkan Peninsula.

Centaurea athoa *DC.* Prodr. **6,** 588 (1837). *C. rupestris* subsp. *athoa* (DC.) Gugl. in Ann. Mus. Hung. **6,** 194 (1907).

Mt. Athos peak, Panaghia, 1550 m., 12.7.34, rocks and stony places, *H. G. Tedd* no. 1507.

Prostrate habit ; yellow florets.

Distribution : Athos endemic.

C. chalcidicaea *Hayek* in Oesterr. Bot. Zeitschr. **64,** 359 (1914).

Mt. Athos peak, 1550—1700 m., 12.7.34, rocks and stony places, *H. G. Tedd* no. 1491.

Sprawling flat habit ; florets bright pink.
Distribution : Athos endemic.

C. Grisebachii *Nym.* Consp. 427 (1878).
Mulyani Islands : Frying Pan Island, 5.6.34, *Mrs. Loch* no. 18.
Distribution : Balkan Peninsular endemic ; Greece, Thessaly, Epirus, Albania, N. and S. Macedonia, Thracian Islands, N. and S. Bulgaria, Rodope Massif, Serbia, Hercegovina.

C. pannosa *DC.* Prodr. **6,** 582 (1837).
Near Vatopedi, 13.7.34, sandy places on and near the sea-shore, *H. G. Tedd* no. 1532.
Plants about 2 ft. high ; florets bright pink.
Distribution : Athos endemic.

Chrysanthemum segetum *L.* Sp. Pl. 889 (1753).
Near Stavronikita, 21.4.34, bare rocky slopes, no. 2558.
Distribution : Europe and Mediterranean Basin east to Caucasus ; Crete, Greece, Cyclades, Thessaly, Epirus, Corfu, S. Macedonia, Athos Peninsula, Thrace, Dalmatia.

Cnicus benedictus *L.* Sp. Pl. 826 (1753).
Above Pyrgos, 25.4.34, on bare granitic slopes, no. 2756.
Distribution : Mediterranean Region, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

Crepis neglecta *L.* Mant. 107 (1767) var. **fuliginosa** (*S. et S.*) *Ch. et B.* Flor. Pelopon. 55 (1838).
Between Pyrgos and Xerxes Canal, on bare stony ground, no. 2449.
Capitulum buds nodding.
Distribution (of species) : E. Mediterranean Basin ; widespread in the Balkan Peninsula.

C. pulchra *L.* Sp. Pl. 806 (1753) var. **adenoclada** *Hausskn.* in Mitt. Thür. Bot. Ver. N.F. **7,** 53 (1895).
South of Pyrgos, 24.4.34, bare slopes above the sea, no. 2724.
Leaves very sticky ; florets yellow.
Distribution (of species) : General European, Mediterranean Region, Caucasus ; Thessaly, N. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif, Dobruja, Serbia, Dalmatia, S. Croatia, Istria.

Crupina Crupinastrum (*Moris*) *Vis.* Flor. Dalm. **2,** 42, t. 51, f. 3 (1847).
Near Dionysiou, 18.4.34, in strong open places in macchia, no. 2466.
Florets rather few about 10 or fewer in every capitulum.
Distribution : Dacian and Mediterranean Basin ; widespread in Mediterranean and Transitional districts of the Balkan Peninsula.

Doronicum Columnae *Ten.* Flor. Nap. Prodr. 49 (1811–15) "f." **orientale** *Hayek* in Denk. K. Akad. Wiss. Wien **94,** 196 (1917).
Hills beyond Pyrgos, 11.4.34, coll. *H. G. Chick*, no. 2624.
Distribution (of species) : Central Europe and Mediterranean Region ; widespread in the Balkan Peninsula, but not Crete.

Filago gallica (*L.*) *L.* Sp. Pl. Add. (1753).
Near Pyrgos, 17.4.34, bare ground in macchia, no. 2451.
Distribution : Central Europe and Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

F. germanica *L.* Syst. ed. 10, 1235 (1759).
Mulyani Islands : small island off Pyrgos, 15.4.34, stony grassy places, no. 2379.
Distribution : E.N. Temperate Region ; general in the Balkan Peninsula.

Hedypnois rhagadioloides (*L.*) *Willd.* Sp. Pl. **3,** 1617 (1804) subsp. **cretica** (*L.*) *Hayek* Prodr. **2,** 807 (1931).

South of Pyrgos, 24.4.34, bare stony ground, no. 2738.

Florets yellow.

Distribution (of species) : Mediterranean Region, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

Helichrysum virgineum (*S. et S.*) *Boiss.* Flor. Or. **3,** 238 (1875).

Mt. Athos, 1934, comm. *Mrs. Loch,* no. 36.

" Flowers blessed by the foot of the Virgin at the top or near the top of Athos, brought by ' The Herbalist '."

Distribution : Athos endemic.

Hypochoeris cretensis (*L.*) *Ch. et B.* Exp. 237 (1832).

Hills above Pyrgos, 27.4.34, no. 2589.

Florets very pale lemon.

Distribution : Italy ; Crete, Greece, Cyclades, Thessaly, Epirus, S. Macedonia, Thrace.

H. glabra *L.* Sp. Pl. 811 (1753).

Near Stavronikita, 21.4.34, on mica-schist slopes in macchia on bare ground towards Pantokratoros, no. 2551 ; grown in the Herbarium Ground, Kew, 13.7.35 and 5.7.35, as K 1453, from seeds collected on hills above Pyrgos, 25.4.34.

Distribution : General European and Mediterranean Basin ; Crete, Greece, Cyclades, S. Macedonia, Thrace, N. Bulgaria, Rodope Massif, Serbia, Montenegro, Istria.

Inula viscosa (*L.*) *Ait.* Hort. Kew. ed. 1, **3,** 223 (1789).

Pyrgos, 20.9.34, *Mrs. Loch* no. 10.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

Jurinea mollis (*L.*) *Reichb.* Flor. Germ. exc. 290 (1831).

Between Dochiariou and Xenophontos, 18.4.34, dry places in macchia, no. 2468.

Distribution : Central Europe and east to the Caucasus ; widespread in the Balkan Peninsula, but not in Crete.

The specimen is young. It was from this same area on the Athos Peninsula that the type material of *Jurinea Hartmannii* Beauv. in Bull. Soc. Bot. Genève 2 me Sér. **6,** 153 (1914) was obtained. Our plant has, however, much more divided leaves (except for those on a lateral non-flowering shoot) and in the early phase of development in which it was collected is indistinguishable from the widely spread *J. mollis* (L.) Reichb.

Lagoseris sancta (*L.*) *K. Maly* in Glas. **20,** 556 (1908).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2421.

Distribution : E. Mediterranean Basin ; widespread in the Balkan Peninsula.

Leontodon crispus *Vill,* subsp. **asper** (*W. et. K.*) *Rohl.* var. **setulosus** (*Hal.*) *Hayek* Prodr. **2,** 813 (1931).

Mt. Athos peak, 1900 m., rock crevices, 12.7.34, *H. G. Tedd* no. 1516, florets yellow, with outer ligules darker orange-red ; near Zographu Monastery, 16.4.34, stony ground in macchia, no. 2414.

Distribution (of species) ; Central Europe, Pontic, Caucasus ; general in the Balkan Peninsula, but not in Crete.

L. tuberosus *L.* Sp. Pl. 799 (1753).

Above Pyrgos, 25.4.34, grassy spot on granitic slopes, no. 2754.

L. tuberosus *L.* var. **Olivieri** (*DC.*) *Hayek* Prodr. **2,** 815 (1931).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2428.

Distribution (of species): Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

Matricaria Chamomilla *L.* Sp. Pl. 891 (1753).

Near Pyrgos, 24.4.34, in dry open stony places, no. 2750.

Distribution: E. N. Temperate Region; general in the Balkan Peninsula.

Pallenis spinosa (*L.*) *Cass.* in Dict. Sci. Nat. **37,** 276 (1825).

Grown in the Herbarium Ground, Kew, 20.8.35 and 21.9.35 as K. 1469, from seeds collected between Pyrgos and the Xerxes Canal, 17.4.34.

Distribution: Europe, Mediterranean Region, and Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

Phagnalon graecum *Boiss. et Heldr.* in Boiss. Diagn. **1,** xi, 6 (1849). *P. rupestre* (L.) DC. subsp. *graecum* (Boiss. et Heldr.) Hayek Prodr. **2,** 600 (1931).

Below Zographu Monastery, 16.4.34, rocky ground in macchia, no. 2427.

Distribution: E. Mediterranean Basin; Crete, Greece, Cyclades, Thessaly, Corfu, Albania, Thrace, Dalmatia.

Picris pauciflora *Willd.* Sp. Pl. **3,** 1557 (1804).

Kapsokalývia, 19.4.34, limestone slopes above sea, no. 2490, flowers yellow; south-east of Pyrgos, 24.4.34, on *Cistus*-clad slopes above the sea, no. 2729, flowers pale yellow.

Distribution: Mediterranean Region and the Caucasus; Crete, Greece, Cyclades, Thessaly, Epirus, N. and S. Macedonia, Thrace, Rodope Massif.

No. 2729 is a much-branched plant with a rather stout stock for an annual and much more luxuriant growth than is usual in the species.

Scorzonera mollis *M. Bieb.* Flor. Taur-Cauc. **3,** 522 (1819).

Above Chilandari, 23.4.34, in open macchia, no. 2700.

Florets yellow.

Distribution: Oriental, Caucasus; Crete, Greece, Cyclades, Epirus, Corfu, N. and S. Macedonia, Thrace, S. Bulgaria, Rodope Massif, Dobruja.

Senecio lividus *L.* Sp. Pl. 867 (1753).

Between Stavronikita and Pantokratoros, 21.4.34, bare stony ground on slopes in macchia, no. 2554.

Distribution: Mediterranean Basin; Greece, Cyclades, Athos Peninsula,

S. vernalis *W. et K.* Pl. Rar. Hung. **1,** 23, t. 24 (1802).

Behind and to S.E. of Pyrgos, 15.4.34, in shady ravine, coll. *H. G. Chick*, no. 2613; south-east of Pyrgos, bare slopes above sea, 24.4.34, no. 2723; grown in the Herbarium Ground, Kew, 20.6.35, as K. 1461, from seeds collected near the Russian Skete, just south-east of the wall of the Holy Territory, 23.4.34.

Distribution: Central Europe, Oriental, Caucasus; Greece, Thessaly, Epirus, Corfu, N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif, Dobruja, Serbia, Montenegro.

Sonchus asper (*L.*) *Hill* Brit. Herb. **1,** 47 (1769) subsp. **glaucescens** (*Jord.*) *Hayek* Prodr. **2,** 840 (1931). *S. glaucescens* Jord. Obs. **5,** 75, t. 5 (1847).

Mulyani Islands: small island off Pyrgos, 13.4.34, coll. *Mrs. Loch and H. G. Chick*, no. 2611; grown, from seeds collected on the Mulyani Islands: Pontiko Island, 25.4.34, in the Herbarium Ground, Kew, 21.9.35, as K. 1477.

Distribution (of species): Cosmopolitan; widespread in the Balkan Peninsula.

Taraxacum. The species of this genus have been named from Handel-Mazzetti: Monographie der Gattung Taraxacum, Leipzig und Wien, 1907, and not on the basis of apomicts.

Taraxacum Hoppeanum *Griseb. et Schenk* in Wiegm. Arch. **18,** 1, 349 (1852) sec. Hand.-Mazz. Monogr. Tarax. 105 (1907).

Asbestochori Cemetery, N. of Salonika, 11.4.34, in open grassy turf, no. 2655.

The following table is a list of specimens grown, from fruits collected on Athos Peninsula, in the Herbarium Ground, Kew.

Number	Locality	Date of collecting	In flower at Kew	Remarks
Z.189	Lavra	19.4.34	8.6.36	Rather large plants
Z.190	Near Chilandari ...	22.4.34	9.5.36	Brownish-red cypselas
Z.191	Between Kapsokalývia and Lavra	19.4.34	23.4.36	Cypselas scarcely 4 mm. long, brownish red
Z.192	Between Simopetra and Karyes	13.4.34	23.4.36	Brownish-red cypselas
Z.194	Vatopedi	21.4.34	23.4.36	Cypselas red
Z.195	S.E. of wall of Holy Territory	24.4.34	9.5.36	Brownish-red cypselas
Z.196	Between Simopetra and Karyes	13.4.34	9.5.36	Brownish-red cypselas. Polymorphic in leaf-shape
Z.197	Near Chilandari ...	22.4.34	23.4.36	Brownish-red cypselas
Z.198	Near Zographu ...	16.4.34	23.4.36	Red cypselas
Z.200	Near Stavronikita ...	21.4.34	23.4.36	Red cypselas
Z.201	Kapsokalývia ...	19.4.34	23.4.36	Red cypselas
Z.202	Chilandari Arsenal ...	22.4.34	23.4.36	Red cypselas
Z.203	Isphigmenou ...	22.4.34	23.4.36	Red cypselas
Z.204	Between Simopetra and Karyes	13.4.34	23.4.36	Red cypselas

Distribution: Central Europe; Athos Peninsula, Montenegro, Bosnia, Herzcegovina, Dalmatia, S. Istria.

T. megalorrhizon (*Forsk.*) *Hand.-Mazz.* Monogr. Tarax. 35 (1907).

Asbestochori Cemetery, N. of Salonika, 11.4.34, no. 2654; grown in the Herbarium Ground, Kew, as Z. 193, 23.4.36, from fruits collected above Zographu Arsenal, 16.4.34; grown in the Herbarium Ground, Kew, as Z. 199, 23.4.36, from fruits collected near Xerxes Canal, 17.4.34.

Distribution: Mediterranean Basin, Mediterranean and Transitional districts of the Balkan Peninsula.

T. obliquum (*Fries.*) *Dahlst.* in Bot. Not. 1905, 752, 164.

Grown in the Herbarium Ground, Kew, as Z. 188, 20.6.36, from fruits collected near Zographu Arsenal, 16.4.34.

Distribution: Europe and Orient; Thessaly, S. Macedonia, Serbia, Bosnia, Dalmatia.

Tolpis umbellata *Bert.* Rar. lig. pl. **1,** 13 (1803) n.v. et Flor. Ital. **8,** 541 (1850).

Between Chilandari and Pyrgos, 23.4.34, in open places in macchia, no. 2713.

Florets pale yellow.

Distribution: Mediterranean Basin; Crete, Greece, Cyclades, Thessaly, S. Macedonia, Thrace.

Tragopogon dubius *Scop.* Flor. Carn. ed. 2, **2,** 95 (1772). *T. major* Jacq. Flor. Austr. **1,** 19, t. 29 (1773).

Simopetra, between the monastery and the arsenal, 13.4.34, on dry stony ground, no. 2354; grown in the Herbarium Ground, Kew, 13.7.35, as K. 1463, from seeds collected south-east of the wall of the Holy Territory, 24.4.34.

Distribution : Central Europe, Pontic, Caucasus ; fairly widespread in the Balkan Peninsula, but not in Crete.

No. 2354 is named with some hesitation. It has a peduncle thickened in the upper part and the leaves agree with *T. dubius*. The florets, however, are longer than the phyllaries, and the root is thicker than is usual in this species.

Tyrimnus leucographus (*L.*) *Cass.* Dict. **41,** 335 (1826).

Near Kapsokalývia, 19.4.34, on dry limestone above the sea, no. 2498.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

Urospermum picroides (*L.*) *F. W. Schmidt* Samml. Phys. Aufs. **1,** 275 (1795) sec. I.K., n.v. ; *Tragopogon picroides* L. Sp. Pl. 790 (1753).

Grown in the Herbarium Ground, Kew, 13.7.35 and 21.9.35, as K. 1483, from seeds collected S.E. of the wall of the Holy Territory, 24.4.35.

Distribution : Mediterranean Region and the Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

The specimens are short and much branched and have small capitula. These characters are probably due to the unfavourable conditions of cultivation.

Zacintha verrucosa *Gaertn.* De Fruct. et Sem. Pl. **2,** 358 (1791).

Above Pyrgos, 25.4.34, on *Cistus*-clad granitic slopes, no. 2753.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of Balkan Peninsula.

Campanulaceae.

Campanula Erinus *L.* Sp. Pl. 169 (1753).

Near Chilandari, 22.4.34, on walls, no. 2675.

Distribution : Mediterranean Region ; Mediterranean and Transitional districts of the Balkan Peninsula.

C. lingulata *W. et K.* Pl. Rar. Hung. **1,** 65, t. 64 (1802).

Simopetra, between the arsenal and the monastery, 13.4.34, dry stony ground, no. 2352 ; on upper beach, beyond Pyrgos, 12.4.34, coll. *H. G. Chick*, no. 2598.

Distribution : Pannonian ; general in the Balkan Peninsula, but not in Crete or Greece.

C. Orphanidea *Boiss.* Flor. Or. **3,** 897 (1875).

Mt. Athos peak, 1900–1970 m., 12.7.34, dwarf tufted plant of rock crevices, infrequent, *H. G. Tedd* nos. 1486, 1487, 1487A.

Corollas darkish blue ; plants of prostrate habit.

Distribution : endemic in the Balkan Peninsula ; Rodope Massif, Athos Peninsula.

C. rotundifolia *L.* Sp. Pl. 163 (1753) subsp. **sancta** *Hayek* Prodr. **2,** 540 (1930) e descr.

Mt. Athos peak, 1550–1970 m., 12.7.34, rock crevices towards the top, *H. G. Tedd* no. 1495.

Corollas dark blue ; plants 4–6 ins. high.

Distribution (of species) : N. Temperate Region ; central and northern districts of the Balkan Peninsula.

C. rupestris *S. et S.* Prodr. **1,** 142 (1806) subsp. **eu-rupestris** *Hayek.* var. **Andrewsii** (*DC*) *Hayek* Prodr. **2,** 525 (1930). *C. Andrewsii* DC. Monogr. Camp. 220 (1830).

Near Simopetra arsenal, 6 m., 13.4.34, on rocks, no. 2347 ; Dochiariou, 18.4.34, on wall, no. 2504, flowers pale bluish-mauve ; grown in the Herbarium Ground, Kew, 19.7.35 (seedlings), as K. 1544, from seeds collected near Vatopedi, 12.7.34, *H. G. Tedd*.

Distribution (of species) : Balkan Peninsular endemic ; Greece, Thessaly, Athos Peninsula.

C. phrygia *Jaub. et Spach* Illustr. Pl. Or. **3,** 42, t. 233 (1847–50).

South-east of Pyrgos, 24.4.34, edge of bare sandy fields, no. 2744 ; hills behind Pyrgos, 11.6.34, *Mrs. Loch* no. 3, a depauperated form with shortened inflorescence branches, and the identification is somewhat doubtful.

Distribution : E. Mediterranean Basin ; Thessaly, N. and S. Mediterranean, Athos Peninsula, Thrace, S. Bulgaria, Rodope Massif, Serbia.

Legousia Speculum-Veneris (*L.*) *Fisch.* ex Schinz et Thell. in Bull. Herb. Boiss. sér. 2, **7,** 343 (1907) var. **pubescens** (*DC.*) *K. Maly* in Mag. Bot. Lap. **7,** 236 (1908).

Xerxes Canal, edge of cultivated fields, 17.4.34, no. 2434.

Distribution (of species) : Mediterranean Basin east to Caucasus ; general in the Balkan Peninsula.

ERICACEAE.

Arbutus Andrachne *L.* Sp. Pl. ed. 2, 566 (1762).

Above Panteleëmon, 14.4.34, in high macchia, no. 2265.

Distribution : E. Mediterranean Basin east to the Caucasus ; S. and E. Mediterranean districts of the Balkan Peninsula.

A. Unedo *L.* Sp. Pl. 395 (1753).

Near Zographu Monastery, 16.4.34, in high macchia, no. 2406 ; below Zographu Monastery, 16.4.34, in high macchia, no. 2415 ; between Lavra and its arsenal, 20.4.34, in high macchia, nos. 2509, 2512, 2513 ; Sithonia (Longos) Peninsula, near Armisti, 19.4.34, coll. *H. G. Tedd,* no. 2663.

Distribution : W. Europe and Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

Erica arborea *L.* Sp. Pl. 353 (1753).

Simopetra, between arsenal and monastery, 13.4.34, in macchia, no. 2283, white flowers ; plateau between Chilandari and Pyrgos, 23.4.34, in macchia under *Pinus halepensis* and *P. Pinea,* no. 2692.

Distribution : Mediterranean Basin east to the Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

E. verticillata *Forsk.* Flor. Aegypt.-Arab. sive Descr. pl. Aeg. Arab. 210 (1775).

Between Lavra and its arsenal, 20.4.34, in macchia, no. 2511 ; Sithonia (Longos) Peninsula, near Armisti, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd,* no. 2647.

Distribution : E. Mediterranean Basin ; Mediterranean districts of the Balkan Peninsula.

PRIMULACEAE.

Anagallis arvensis *L.* Sp. Pl. 148 (1753) s.l.

South-east of Pyrgos, 24.4.34, bare stony ground by the sea, no. 2725, flowers vermilion-scarlet ; Mulyani Islands, 13.4.34, no. 2599, flowers blue.

Distribution : Cosmopolitan ; general in the Balkan Peninsula.

The nomenclature of the intra-specific phenotypes of *A. arvensis* has not yet been satisfactorily settled. No. 2599 is a variety with very broadly ovate leaves and rather blue large corollas, whose lobes are densely glandular at the margins.

Asterolinum linum-stellatum (*L.*) *Duby* in DC. Prodr. **8,** 68 (1844).

Mulyani Islands, dry stony places, 15.4.34, No. 2382.

Distribution : Mediterranean Region and Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

Cyclamen neapolitanum *Ten.* Flor. Nap. **3,** 197, t. 118 (1811–36).

Cultivated in the Herbarium Ground, Kew, 1934–36, in flower 3.10.35 and 17.9.36, as K 1392, from tubers collected between Simopetra and Karyes, 13.4.34.

The common autumn-flowering *Cyclamen* of Athos Peninsula has been identified as *C. graecum* Link in Linnaea **9,** 573 (1825) by Boissier (Flor. Or. **4,**

13 : 1875), and accepted as such by Pax (in Pflanzenr. iv. 237, 254 : 1905), and as *C. neapolitanum* Ten. by Tocl and Rohlena (Sitz. k. böhm. Ges. Wiss. Prag. : 1902, p. 5 of separate) and by Bornmüller (in Engl. Bot. Jahrb. **61,** 13 : 1927).

The confusion is understandable as the two species are closely related and *C. neapolitanum* Ten. is decidedly polymorphic, especially in foliage characters. Moreover the Athos material, as seen in spring, has certain characters which are not regarded as typical for *C. neapolitanum* Ten. Thus, many of the leaves are not or are scarcely lobed, some are relatively large, and the leaf-margin is decidedly cartilaginous. A study of the living plants, flowered at Kew for two seasons from tubers collected on Athos Peninsula, and comparison with living flowering material of *C. neapolitanum* Ten. grown at Kew from tubers collected in Dalmatia, has shown that the identification of the Athos plant as *C. neapolitanum* Ten. must stand and there is no direct evidence known to the writer that *C. graecum* is distributed as far north as the Athos Peninsula.

Distribution : S. Europe ; fairly widely spread in the Balkan Peninsula, especially in the Mediterranean and Transitional districts.

Plumbaginaceae.

Armeria sancta *Janka* in Termesz. Füz. **6,** parte I-II., 2 (1882) e descr.

Near Stavronikita, 21.4.34, bare rocky slopes by the sea, no. 2561, flowers pink.

Distribution : Athos endemic.

Hayek's account, in Prodr. Penins. Flor. Balc. **2,** 13 (1928) is unsatisfactory. He describes the calyx as aristate whereas Janka says " calycis limbus subtruncatus, lobi latissimi brevissimi, aristae brevissimae mucroniformes, crassiusculae, incurvae." Further, Hayek gives the habitat as " in pascuis subalpinis et alpinis," whereas the type was " e rupibus maritimis pr coenobuim Lavra ad ped. m. Athos."

Limonium angustifolium (*Tausch*) comb. nov. *Statice angustifolia* Tausch in Syll. Ratisb. **2,** 254 (1828).

Mulyani Islands : Pontiko Island, Sept. 1934, *Mrs. Loch* no. 33.

Distribution : Mediterranean Basin, east to Caucasus ; most coastal districts of the Balkan Peninsula.

L. Gmelini (*Willd.*) *O. Ktze.* Rev. Gen. **1,** 395 (1891).

Mulyani Islands : Pontiko Island, Sept. 1934, *Mrs. Loch* no. 15.

Distribution : E. Mediterranean Region ; southern and eastern districts of the Balkan Peninsula.

L. sinuatum (*L.*) *Mill.* Gard. Dict. (1768).

Near Vatopedi, 12.7.34, sandy grassy places near the sea shore, *H. G. Tedd* no. 1531.

Flowers white, then mauve.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, Athos, Thrace, Thracian Islands.

Oleaceae.

Fraxinus Ornus L. Sp. Pl. 1057 (1753).

Kapsokalývia, 19.4.34, dry slopes in macchia, no. 2484.

Flowers white.

Distribution : Mediterranean Basin and Pontic ; general in the Balkan Peninsula, but not in Crete.

Olea europaea *L.* Sp. Pl. 8 (1753) subsp. **oleaster** (*Hoffm. et Lk.*) *Fiori* in Fiori e Paol. Flor. Anal. It. **2,** 338 (1902).

Head of Cassandra Gulf, 12.4.34, in macchia, nos. 2574 (large leaves), 2575 (small leaves).

O. europaea *L.* subsp. **sativa** (*Hoffm. et Lk.*) *Fiori* l.c.

S.-E. of Pyrgos, cultivated on bare ground near the sea, 24.4.34, no. 2745. Basal shoots prickly and with small leaves. Crown shoots without spines and with large leaves.

Distribution (of species): Mediterranean Region, Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

Phillyrea media *L.* Sp. Pl. ed. 2, 10 (1762).

Head of Cassandra Gulf, 12.4.34, in macchia, no. 2595.

A very small-leaved variety or form.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

BORAGINACEAE.

Alkanna graeca *Boiss. et Sprun.* in Boiss. Diagn. **1,** iv, 47 (1844).

Simopetra, between the arsenal and the monastery, 13.4.34, stony ground in macchia zone, no. 2286.

Corollas orange-yellow.

Distribution: Balkan Peninsular endemic; Greece, Epirus, S. Macedonia.

Much less glandular than in typical specimens of the species, and thus verging towards *A. boeotica* DC.

A. tinctoria (*L.*) *Tsch.* Flora **7,** 1, 234 (1824).

Asbestochori Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2592.

Deep blue corollas.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

Anchusa italica *Retz.* Obs. **1,** 12 (1779).

Near Stavronikita, 21.4.34, on stony ground, no. 2562.

Corollas deep blue.

Distribution: Mediterranean Region and the Caucasus; widespread in the Balkan Peninsula.

Anchusa officinalis *L.* Sp. Pl. 133 (1753) var. **moesiaca** (*Vel.*) *Guşul.* in Bull. Fac. Şt. Cern. **1,** 102 (1927).

Hills beyond Pyrgos, June 1934, *Mrs. Loch* no. 26; between Dochiariou and Xenophontos, 18.4.34, in macchia zone on stony ground, no. 2503, corollas rich deep violet; Sithonia (Longos) Peninsula, near Armisti, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd*, no. 2645.

Distribution (of species): General European, Mediterranean Region, Caucasus; widespread in the Balkan Peninsula, but not in Crete.

Cerinthe minor *L.* Sp. Pl. 137 (1753).

Near Kapsokalývia, 19.4.34, dry bushy slopes, on limestone, no. 2477.

Corolla lobes yellow, bronze below.

Distribution: Central Europe, Mediterranean Region, Caucasus; widespread in the Balkan Peninsula.

Cynoglossum creticum *Mill.* Gard. Dict. (1768).

Simopetra, between the arsenal and the monastery, 13.4.34, dry stony bank, no. 2348.

Distribution: Mediterranean Region; widespread in the Balkan Peninsula.

Echium plantagineum *L.* Mant. **2,** 202 (1771).

Hills behind Pyrgos, June 1934, *Mrs. Loch* no. 27; above Simopetra, 13.4.34, stony dry open ground, no. 2340, violet-purple flowers; Mulyani Islands: small island off Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2626.

Distribution: Mediterranean Basin and east to the Caucasus; widespread in the Balkan Peninsula.

Heliotropium europaeum *L.* Sp. Pl. 130 (1753).

Pyrgos, among stones in the street, 25.4.34, no. 2758A.

Corollas white.

Distribution : Central Europe, Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

H. suaveolens *M. Bieb.* Flor. Taur-Cauc. **3,** 116 (1819).

Pyrgos, among stones in the street, 25.4.34, no. 2758.

Corollas white.

Distribution : Oriental, Pontic, Caucasus ; Cyclades, Thessaly, Albania, N. and S. Macedonia, Thrace, N. and S. Bulgaria, Rodope Massif, Dobruja.

Myosotis cadmea *Boiss.* Diagn. **1,** xi. 122 (1849).

On high ridge from above Simopetra to Karyes, 13.4.34, semi-open places in woods, no. 2328.

Flowers large for the size of the plant ; corollas of an intense azure blue.

Distribution : E. Mediterranean Basin ; N. and S. Macedonia, Thrace, Rodope Massif.

M. collina *Hoffm.* Deutsch. Flor. ed. 1, 61 (1791).

Near Karyes, 13.4.34, grassy bank, no. 2372, pale blue flowers ; Mulyani Islands : small island off Pyrgos, 15.4.34, dampish place amongst brushwood, no. 2395.

Distribution : Central Europe, Mediterranean Region ; general in the Balkan Peninsula.

M. versicolor *Sm.* Engl. Bot. sub. t. 2558 (1814).

Cultivated in the Herbaceous Department, Kew, as 501 35, 13.2.36, from seeds collected near Pyrgos, *Mrs. Loch.*

Distribution : Central Europe ; Corfu, Serbia.

A form with few or no uncinate hairs on the calyx. Determined by Mr. A. E. Wade.

Onosma paradoxum *Janka* in Oesterr. Bot. Zeitschr. **22,** 180 (1872). *O. Aucherianum* DC. subsp. *pallidum* (Boiss.) Hayek var. *paradoxum* (Jka.) Hayek Prodr. **2**, 86 (1928).

Kapsokalývia, 19.4.34, limestone slopes above sea, no. 2489.

Pale yellow corollas.

Distribution : Athos endemic.

The locality of Janka's type is given (l.c.) as " in m. Athos regionis mediae pineto infra Panajia."

Symphytum bulbosum *Schimp.* in Flora **8,** 17 (1825).

High up on the ridge above Karyes, from Simopetra, 13.4.34, in a rather damp semi-shady place in woods of *Castanea*, no. 2321.

Cream-coloured corollas.

Distribution : Central and S. Europe ; Greece, Thessaly, Corfu, N. and S. Macedonia, Thrace, N. and S. Bulgaria, Rodope Massif, Dalmatia, Istria.

S. ottomanum *Friv.* in Flora **19,** 439 (1836).

Sithonia (Longos) Peninsula, near Armisti, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd*, no. 2646 ; in Karyes, under a wall by a path-side, 14.4.34, no. 2275.

White corollas with protruding stamens. A tall plant.

Distribution : Balkan Peninsular type, north to Banat ; Greece, Thessaly, Epirus, N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif.

Convolvulaceae.

Convolvulus elegantissimus *Mill.* Gard. Dict. ed. 8 (1768).

Simopetra, between the arsenal and the monastery, 13.4.34, dry stony ground, no. 2351.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of Balkan Peninsula.

Hyoscyamus albus *L.* Sp. Pl. 180 (1753).

Cultivated in the Herbarium Ground, Kew, 20.8.35 and 11.35 (fruit), as K. 1464, from seeds collected at Isphigmenou, 22.4.34.

Distribution: Mediterranean Region; Mediterranean and Transitional districts of the Balkan Peninsula.

Antirrhinum Orontium *L.* Sp. Pl. 617 (1753).

Simopetra, above the arsenal, 13.4.34, no. 2368.

Pink corallas.

Distribution: E. N. Temperate Region; widespread in the Balkan Peninsula.

Bellardia Trixago (*L.*) *All.* Flor. Peden **1**, 61 (1785). *Trixago apula* Stev. Mem. Soc. Nat. Mosc. **6,** 4 (1823) n.v.

Hills behind Pyrgos, 15.6.34, *Mrs. Loch* no. 8; near Chilandari, 22.4.34, sandy fields near the sea, no. 2679.

Corollas pink and white.

Distribution: Mediterranean Region, Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

Linaria genistifolia *Mill.* Gard. Dict. ed. 8 (1768).

Mt. Athos, flowers all the summer, 1934, *F. S. Loch* no. 32.

Height of bush 2 ft.

Distribution: E. N. Temperate Region; Thessaly, Albania, N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif, Dobruja, Serbia, S. Croatia.

L. pelisseriana (*L.*) *Mill.* Gard. Dict. ed. 8 (1768).

Mulyani Islands: small island opposite Pyrgos, 13.4.34, coll. *H. G. Chick*, no. 2633.

Purple corollas.

Distribution: Mediterranean Basin east to the Caucasus; widespread in the Balkan Peninsula.

Parentucellia latifolia (*L.*) *Car.* in Parl. Flor. It. **6,** 480 (1885).

Near Xerxes Canal, 17.4.34, bare patches on grassy ground, no. 2445.

Distribution: Mediterranean Region, Caucasus; widespread in the Balkan Peninsula.

Scrophularia heterophylla *Willd.* Sp. Pl. **3,** 274 (1801) subsp. **laciniata** (*W. et K.*) *Maire et Petitm.* var. **variegata** (*Reichb.*) *Hayek* Prodr. **2,** 152 (1929).

Simopetra, between the monastery and the arsenal, 14.4.34, stony banks, no. 2296.

Corollas chocolate-purple.

Distribution (of species): E. Mediterraean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

S. peregrina *L.* Sp. Pl. 621 (1753).

Simopetra, between the monastery and the arsenal, 13.4.34, stony ground no. 2358. A robust branched form.

Distribution: Mediterranean Region; Mediterranean and Transitional districts of the Balkan Peninsula.

Verbascum banaticum *Roch.* ap. Schrad. Mon. Verb. **2,** 28 (1823).

South-east of Pyrgos, 24.4.34, on *Cistus*-clad slopes, no. 2726; cultivated in the Director's Garden, Kew, 1936, from seeds sent by Mrs. Loch.

Flowers yellow, filament hairs white. Plants up to 2 m. high. One of the species called "Phlomos" and used for fish poisoning.

Distribution: Pannonian; Thessaly, Epirus, Albania, N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif, Dobruja, Serbia.

V. phoeniceum *L.* Sp. Pl. 178 (1753).

Near Xerxes Canal, 17.4.34, on bare ground, no. 2447.

Distribution: E. N. Temperate Region; widespread in the Balkan Peninsula, except Greece and Crete.

Veronica Anagallis-aquatica *L.* Sp. Pl. 12 (1753).

Hills behind Pyrgos, 6.34, *Mrs. Loch* no. 24.

Distribution: Cosmopolitan; general in the Balkan Peninsula.

V. arvensis *L.* Sp. Pl. 13 (1753).

Near Chilandari, 22.4.34, on walls, no. 2671.

Distribution: E. N. Temperate Region; general in the Balkan Peninsula.

V. Chamaedrys *L.* Sp. Pl. 13 (1753) var. **pilosa** (*Schm.*) *Benth.* in DC. Prodr. **10,** 475 (1846).

Above Simopetra, on way to Karyes, 600 m., 13.4.34, in *Castanea* woods in half-shade, no. 2329, a large-flowered form with pale blue corollas; S. E. of Pyrgos, in ravine, 14.4.34, coll. *H. G. Chick*, no. 2604.

Distribution (of species): E. N. Temperate Region; general in the Balkan Peninsula, but not Crete.

V. Cymbalaria *Bod.* Mem. 3, ex Bertol. Amoen. Ital. 56 (1892).

Simopetra, between the monastery and the arsenal, 13.4.34, no. 2290, abundant, corollas white; cultivated in the Herbarium Ground, Kew, from seeds collected near Simopetra, 13.4.34, as K.1456, 1478, 1491, 20.6.35, 5.7.35, and 13.7.35.

Distribution: Mediterranean Basin; widespread in the Balkan Peninsula.

V. hederifolia *L.* Sp. Pl. 13 (1753).

Cultivated in the Herbarium Ground, Kew, 2.5.35 and 20.6.35, as K.1444, from seeds collected near Chilandari Arsenal, 22.4.34.

Distribution: General European, Mediterranean Region, Caucasus; general in the Balkan Peninsula.

Orobanchaceae.

Orobanche caryophyllacea *Sm.* Trans. Linn. Soc. **4,** 169 (1798).

Between Pyrgos and Xerxes Canal, 17.4.34, stony places in depauperated macchia, no. 2435, corollas mauve outside, yellowish within, stigma dark brick red; no. 2435A, a form or variety with pale-coloured corollas.

With the odour of cloves. Appeared to be parasitic on grasses.

Distribution: Central and S. E. Europe and Caucasus; widespread in the Balkan Peninsula, but not in Crete.

O. Grisebachii *Reut.* in DC. Prodr. **11,** 28 (1847).

Hills behind Pyrgos, 15.6.34, *Mrs. Loch* no. 7.

Distribution: Oriental; Crete, Greece, Athos Peninsula.

O. lavandulacea *Reichb.* Pl. Crit. **7,** 48, f. 935 (1829).

Near Kapsokalývia, 19.4.34, among stones on hot dry limestone slopes, no. 2475.

Parasitic on *Psoralea*. Corollas deep bluish-mauve.

Distribution: Mediterranean Basin; Crete, Greece, Corfu, Dalmatia.

O. minor *Sutt.* in Trans. Linn. Soc. **4,** 179 (1798).

Near Pyrgos, 1934, coll. *H. G. Chick*, comm. *Mrs. Loch* no. 37, a variety or form with strongly pilose-glandular corollas; Mulyani Islands: small island opposite Pyrgos, 25.4.34, no. 2759, parasitic on *Hypericum* sp., stigma dark mauve, corolla whitish mauve within, darker without, no odour of cloves.

Distribution: N. Temperate Region; widespread in the Balkan Peninsula, but not in Crete.

O. minor *Sutt.* forma (vel. var.?) **minima** *Beck* in Bibl. Bot. Heft **19,** 252 (1890).

Hills behind Pyrgos, 6.34, *Mrs. Loch* no. 25.

O. Muteli *F. Schultz* in Mutel Flor. Fr. **2,** 353 (1835).

Above Simopetra, 14.4.34, stony ground, no. 2334, parasitic on *Calendula* or grass; below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2425, pale lavender corollas, parasitic on *Calendula*.

Distribution: Mediterranean Region, Dacian, Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

O. nana *Noé* ex Reut. in DC. Prodr. **11,** 9 (1847).

Mulyani Islands: second small island off Pyrgos, 15.4.34, coll. *H. G. Chick*, no. 2404.

Distribution: Mediterranean Region and Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula, but not Crete.

O. ramosa *L.* Sp. Pl. 633 (1753).

Hills behind Pyrgos, 15.6.34, *Mrs. Loch* no. 6.

Distribution: Central Europe and Mediterranean Basin; widespread in the Balkan Peninsula.

O. reticulata *Wallr.* Orob. gen. διασκ. 42 (1825).

Mt. Athos peak, 1900 m., 12.7.34, crevices of stones, etc., on rocky hillside, *H. G. Tedd* no. 1484.

Corollas yellowish, with pink streaks; stigma red.

Distribution: Central and S. E. Europe; Greece, Albania, S. Macedonia, Athos Peninsula, N. Bulgaria, Rodope Massif, Dobruja, Serbia, Montenegro, Bosnia, Hercegovina.

Selaginaceae.

Globularia Alypum *L.* Sp. Pl. 95 (1753).

Near the end of the Gulf of Cassandra, 12.4.34, forming colonies in depauperated macchia, no. 2594.

Bluish-mauve flowers.

Distribution: Mediterranean Basin; Crete, Greece, Cyclades, S. Macedonia.

Labiatae.

Ajuga Chamaepitys *(L.) Schreb.* Pl. Unilab. p. xxiii. (1774) var. **grandiflora** *Vis.* Flor. Dalm. **2,** 222 (1847).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2419.

Distribution: Central Europe, Mediterranean Region, Caucasus; general in the Balkan Peninsula, but not in Crete.

Calamintha alpina *(L.) Lam.* Flor. Fr. **2,** 394 (1778) var. **granatensis** *(Boiss. et Reut.) Hal.* Consp. **2,** 544 (1902).

Mt. Athos peak, 1550–1900 m., 12.7.34, rocks on stony path, etc., *H. G. Tedd* no. 1520.

Prostrate habit, corollas dark violet-purple.

Distribution (of species): S. European mountains, Central Europe; widespread in the Balkan Peninsula.

The variations of *C. alpina*, and the separation of this species from neighbouring species, have perplexed taxonomists. Tedd's material from Mt. Athos fits into the var. *granatensis* in the sense of Briquet's description in Flor. des Alpes maritimes 450 (1895), except that it has somewhat smaller more rounded leaves. With the advent of more material of *C. alpina* from the Balkan Peninsula it may be found advisable to give the Athos plant a distinctive name. It should, however, be noted that morphological intermediates occur between the extreme Athos type and the Spanish original, especially in Greece.

C. vulgaris *(L.) Druce* in Ann. Scot. Nat. Hist. 1906, 224.

Grown in the Herbarium Ground, Kew, 8.8.34, as K.1443, from previous year's seeds collected near Zographu Arsenal, 16.4.34.

Distribution: E. N. Temperate Region; general in the Balkan Peninsula.

Lamium bifidum *Cyr.* Pl. Rar. Neap. **1,** p. xxii (1788).

Above Simopetra, on the way to Karyes, 13.4.34, high up in the woods, no. 2304.

Corollas white. Leaves generally with a white blotch.

Distribution : Italy ; Mediterranean and Transitional districts of the Balkan Peninsula.

L. garganicum *L.* Sp. Pl. ed. 2, 808 (1763) var. **glabratum** *Griseb* Spic. **2,** 133 (1844).

Simopetra, between the monastery and the arsenal, 13.4.34, no. 2359.

Purplish-pink flowers.

Distribution (of species) : Italy, Greece, Thessaly, Albania, N. Macedonia, Thrace, N. Bulgaria, Serbia.

L. maculatum *L.* Sp. Pl. ed. 2, 809 (1753) var. **echinatum** *Griseb.* Spic. **2,** 134 (1844).

Above Karyes, 13.4.34, woods and banks in semi-shade, no. 2306.

Corollas purple. With or without a white blotch to the leaves.

Distribution (of species) : General European, Pontic, Caucasus ; widespread in the Balkan Peninsula, but not in Crete.

L. striatum *S. et S.* Prodr. **1,** 405 (1806) var. **glabratum** *Griseb.* Spic. **2,** 133 (1844).

Above Karyes, 14.4.34, shady places in woods, no. 2307.

Large white corollas. No white blotch on the leaves.

Distribution (of species) : E. Mediterranean Basin ; Crete, Greece, Epirus, Albania, N. and S. Macedonia, Athos Peninsula, Thracian Islands.

Mentha Pulegium *L.* Sp. Pl. 577 (1753) var **subtomentella** *H. Br.* var. **hirsuta** (*Pér.* in Bull. Soc. Bot. Fr. **17,** 203 : 1870, as *Pulegium vulgare* Mill. forma *hirsutum*) Briq. Lab. des Alpes marit. 94 (1891).

Pyrgos, sea-level, 24.7.34, *Mrs. Loch* no. 31.

Distribution (of species) : E. N. Temperate Region ; general in the Balkan Peninsula.

Micromeria Juliana *Benth.* Lab. 373 (1834).

Cultivated in the Herbarium Ground, Kew, 20.4.35, as K.1465, from seeds collected above Zographu Arsenal, 16.4.34.

Distribution : E. Mediterranean Basin ; widespread in the Balkan Peninsula.

Nepeta Sibthorpii *Benth.* Lab. 474 (1834).

Mt. Athos peak, near Panaghia, 1500–1550 m., 12.7.34, waste stony and rocky places, *H. G. Tedd* no. 1528.

Corollas yellowish white ; the plants have a pungent odour.

Distribution : Balkan Peninsula endemic ; Greece.

Origanum hirtum *Link* Enum. **2,** 114 (1822).

Grown in the Herbarium Ground, Kew, 8.8.35, as K.1396, from seeds collected above Zographu monastery, 16.4.34.

Distribution : E. Mediterranean Basin ; widespread in the Balkan Peninsula.

Phlomis samia *L.* Sp. Pl. 585 (1753).

Mt. Athos peak, 920–1550 m., 12.7.34, waste stony places, *H. G. Tedd* no. 1527.

Corollas brownish-red ; plant about 1 m. high.

Distribution : E. Mediterranean Basin ; Greece, Thessaly, S. Macedonia, Athos Peninsula.

Prasium majus *L.* Sp. Pl. 601 (1753).

Mulyani Islands : one of the smaller islands off Pyrgos, 15.4.34, dampish places in brushwood, coll. *H. G. Chick,* no. 2392.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

Rosmarinus officinalis *L.* Sp. Pl. 23 (1753).

Panteleëmon, 14.4.34, on the walls of the monastery, no. 2264.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

Salvia clandestina *L.* Sp. Pl. ed. 2, 36 (1762).

Near the Russian skete, E. of Pyrgos, 23.4.34, on stony ground, no. 2708. Corollas blue.

Distribution : Mediterranean Region ; Mediterranean and Transitional districts of the Balkan Peninsula.

The material approximates to the var. *multifida* (S. et S. Prodr. **1,** 16 : 1806 pro sp.).

Salvia triloba *L. fil.* Suppl. 88 (1781).

Between Dochiariou and Xenophontos, 18.4.34, stony and rocky sunny open slope in macchia zone, no. 2502, flowers rather pale mauve ; cultivated at Iviron, 20.4.34, no. 2546, grown in the monastery garden but said to have come from high up on Mt. Athos. The leaves and young shoots are used for making a tea infusion.

Distribution : Italy, Sicily, E. Mediterranean Region ; Crete, Greece, Cyclades, Corfu, Thrace, Hercegovina.

S. Verbenaca *L.* Sp. Pl. 25 (1753).

Near the Russian skete, E. of Pyrgos, 23.4.34, on stony ground, no. 2707. Corollas deep mauve.

Distribution : W. Europe, Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

S. viridis *L.* Sp. Pl. 24 (1753).

Between Pyrgos and Xerxes Canal, 17.4.34, bare slopes below macchia, near the sea, no. 2458.

Corollas bluish-mauve.

Distribution : Mediterranean Basin, Pontic, Caucasus ; Crete, Greece, Cyclades, Corfu, N. and S. Macedonia, Thrace, Dalmatia.

Scutellaria albida *L.* Mant. altera 248 (1771).

Near Kapsokalývia, 19.4.34, dry bushy limestone slopes, no. 2485, corollas with lower lip nearly white, otherwise purplish-red ; Mt. Athos peak, 1900m., 12.7.34, rocks, *H. G. Tedd* no. 1515.

Distribution : E. Mediterranean district, Banat, Caucasus ; fairly widespread in the Balkan Peninsula, but not in Crete.

Sideritis romana *L.* Sp. Pl. 575 (1753).

Near Chilandari, 22.4.34, on walls, no. 2677.

Corollas white.

Distribution : Mediterranean Basin ; Montenegro, Hercegovina, Dalmatia, S. Croatia, Istria.

Stachys arvensis *L.* Sp. Pl. ed. 2, 814 (1763).

Near Stavronikita, towards Pantokratoros, 21.4.34, in macchia on mica-schist slopes, on bare ground, no. 2552.

Distribution : General European ; Crete, Greece, Corfu, Albania, N. Bulgaria, Dalmatia, S. Croatia.

Stachys cassia *Boiss.* Diagn. **1,** xii 76 (1853) var. **athoa** *Hal.* ex Hayek Prodr. **2,** 285 (1929).

Hills behind Pyrgos, 6.34, *Mrs. Loch* no. 28.

Distribution (of species) : E. Mediterranean Basin ; Greece, Thessaly, N. and S. Macedonia, Athos Peninsula, Thrace, S. Bulgaria, Rodope Massif, Serbia, Dalmatia.

Teucrium montanum *L.* Sp. Pl. 565 (1753).

Mt. Athos peak, 1900 m., 12.7.34, rocks and rock crevices, *H. G. Tedd* no. 1498.

Corollas light yellow.

Distribution : E. N. Temperate Region ; general in the Balkan Peninsula, but not in Crete.

Thymus heterotrichus *Griseb.* Spic. **2,** 116 (1844).

Above Simopetra, on way to Karyes, 13.4.34, dry strong ground, no. 2339. Very pale mauve corollas.

Distribution : Balkan Peninsular type ; Thessaly, N. and S. Macedonia, Athos Peninsula, N. and S. Macedonia, Rodope Massif, Serbia.

T. Jankae *Čel.* in Flora **66,** 147 (1883) var. **robustior** *Vel.* Rel. Mrkv. 25 (1922) **x T. ocheus** *Heldr. et Sart.* ?

Mt. Athos peak (Panaghia), 1550 m., 12.7.34, rocks and stony slopes, *H. G. Tedd* no. 1500.

The specimens have very strong woody bases. The two suggested parents grow, apparently in close proximity, on Athos peak.

T. ocheus *Heldr. et Sart.* in Boiss. Diagn. **2,** iv 6 (1859).

Mt. Athos peak (Panaghia), 1500 m., 12.7.34, stony places, *H. G. Tedd* no. 1509.

Corollas bright pink. The specimens are remarkable for the crowded lower leaves of the flowering branches, these leaves being smaller than those immediately below the inflorescences. The flowering stems and middle and upper leaves are very densely clothed with white hairs. It is possible that this is a distinct subspecies or variety from the type plant from Euboea.

Distribution : Balkan Peninsular endemic ; Greece, N. and S. Bulgaria, Athos Peninsula, Rodope Massif.

T. Toševii *Vel.* in Sitz. Böhm. Ges. Wiss. 1903, 15.

Mt. Athos peak, Panaghia, 1550 m., 12.7.34, rocks, *H. G. Tedd* no. 1510.

Distribution. Balkan Peninsular endemic ; Thessaly, N. and S. Macedonia, N. and S. Bulgaria, Serbia.

The specimens appear to come near to var. *Degenii* (H. Br.) Ronn. and to var. *Turrillii* Ronn. The latter is known only from Mt. Vitoša in Bulgaria.

Plantaginaceae.

Plantago Bellardi *All.* Flor. Pedem. **1,** 82, t. 85 (1785).

Near Pyrgos, bare ground in macchia, 17.4.34, no. 2450.

Distribution : Mediterranean Region ; Mediterranean and Transitional districts of the Balkan Peninsula.

P. Coronopus *L.* Sp. Pl. 115 (1753).

Mulyani Islands : Pontiko Island, 15.4.34, dry stony places, no. 2386.

Distribution : Central Europe and Mediterranean Region ; widespread in the Balkan Peninsula, especially in the coastal districts.

P. Lagopus *L.* Sp. Pl. 114 (1753).

Between Pyrgos and Xerxes Canal, 17.4.34, grassy ground near the shore, no. 2452.

This is a very small form or variety growing in poor soil.

Distribution : Mediterranean Region and Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

Illecebraceae.

Herniaria hirsuta *L.* Sp. Pl. 218 (1753).

Mulyani Islands : Pontiko Island, 15.4.34, dry stony places, no. 2387.

Distribution : Old World ; general in the Balkan Peninsula.

Scleranthus dichotomus *Schur* in Verhl. Siebenb. Ver. Naturw. **2,** 10 (1851).

South-east of Pyrgos, 23.4.34, stony ground in macchia, no. 2711.

With rather long slender leaves and relatively large young flowers.

Distribution : S. Europe ; N. and S. Macedonia, N. and S. Bulgaria, Dobruja, Serbia.

Polygonum Kitaibeliana *Sadl.* Flor. Pest. **1,** 287 (1825).

Pyrgos, 10.12.34, *Mrs. Loch* no. 21.

Distribution : N. Temperate Region ; widespread in the Balkan Peninsula, but not in Crete.

Rumex Acetosella *L.* Sp. Pl. 338 (1753) approximating to the var. **multifidus** (*L.*) DC. Flor. Fr. **3,** 378 (1805).

High above Karyes, 13.4.34, No. 2282A.

The leaves on the young shoots range from simple to hastate with simple or once divided basal lobes.

Distribution (of species) : cosmopolitan ; general in the Balkan Peninsula.

ARISTOLOCHIACEAE.

Aristolochia pallida *Willd.* Sp. Pl. **4,** 162 (1805).

Near Iveron, 20.4.34, edge of macchia, no. 2544.

Pale brown perianth with greenish tube and chocolate colour inside the throat.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula, but not in Crete.

A. rotunda *L.* Sp. Pl. 962 (1753).

Sithonia (Longos) Peninsula, near Armisti, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd*, no. 2650.

Distribution : Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

CYTINACEAE.

Cytinus Hypocistis *L.* Syst. ed. 12, **2,** 602 (1767) var. **kermesinus** *Guss.* Flor. Sic. Syn. **2,** 619 (1844).

Between Chilandari and Pyrgos, 23.4.34, parasitic on *Cistus* sp., in macchia under *Pinus halepensis* L.

Distribution : Mediterranean districts of the Balkan Peninsula.

EUPHORBIACEAE.

Euphorbia acanthothamnos *Heldr. et. Sart.* in Boiss. Diagn. **2,** iv. 86 (1859).

Kapsokalývia, 19.4.34, dry limestone slopes, No. 2482.

Spiny plants forming large rounded bushes, with strong unpleasant odour when in flower.

Distribution : E. Mediterranean Basin ; Crete, Greece, Cyclades, Corfu, S. Macedonia, Athos Peninsula.

E. amygdaloides *L.* Sp. Pl. 463 (1753).

Above Karyes, c. 650 m., 14.4.34, in *Castanea* woods, no. 2273.

Distribution : Central Europe, Mediterranean Region, Caucasus ; general in the Balkan Peninsula north of Greece.

E. Apios *L.* Sp. Pl. 457 (1753).

Asbestochori Cemetery, north of Salonika, 11.4.34, grassy places, no. 2584 ; above Panteleëmon, 14.4.34, dry bank in woods, no. 2268.

Distribution : E. Mediterranean Basin ; Crete, Greece, Thessaly, S. Macedonia, Athos Peninsula, Thrace, S. Bulgaria, Rodope Massif.

E. dendroides *L.* Sp. Pl. 462 (1753).

East of Kapsokalývia, 19.4.34, dry bushy slopes, on crystalline limestone, no. 2477, floral leaves yellow, lobes yellow and bronze below ; near Dionysiou, 18.4.34, half-open places in macchia, in clefts of rocks, no. 2464.

A tall branched plant, with woody stems up to 4 cm. in diameter.

Distribution : Mediterranean Basin ; Crete, Greece, Cyclades, Corfu, Albania, Montenegro, Dalmatia.

E. graeca *Boiss. et Sprun.* in Boiss. Diagn. **1,** v, 53 (1844).

Zographu, 16.4.34, bare stony ground in high macchia. no. 2407 ; south-east of Pyrgos, 24.4.34, on slopes between bushes of *Cistus*, no. 2722.

No. 2407 is a very interesting plant which is placed under *E. graeca* with some hesitation. While it agrees well with typical specimens of the species in important diagnostic characters, its habit appears very different. It is suffruticose, with many long slender branches arising from the base.

Distribution : Oriental, Caucasus ; widespread in the Balkan Peninsula.

E. Helioscopia *L.* Sp. Pl. 459 (1753).

Plants cultivated in the Herbarium Ground, Kew, 9.8.35, as K.1489, from seeds collected above Simopetra, 13.4.34 ; above Simopetra, c. 190 m., 13.4.34, stony ground among Mediterranean hill-flora, no. 2336 ; an interesting form or variety with red stems, branched from the base, fruits glabrous.

Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

E. oblongata *Griseb.* Spic. **1,** 136 (1843).

Between Stavronikita and Pantokratoros, 21.4.34, no. 2557. From the type locality of Grisebach. Abundant in the macchie and in open places on mica-schist. Bracts yellow, scales entire, ovary verrucose.

Distribution : Balkan Peninsular endemic ; Crete, Greece, Cyclades, Thessaly, Epirus, S. Macedonia, Athos Peninsula, Thrace, S. Bulgaria, Rodope Massif.

E. Peplis *L.* Sp. Pl. 455 (1753).

Mulyani Islands, on sand-bar near sea-level, 20.4.34, *Mrs. Loch* no. 11.

Distribution : W. Europe, Mediterranean Basin, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

E. veneta *Willd.* Enum. Pl. Hort. Berol. 507 (1809).

Simopetra, between the arsenal and the monastery, 14.4.34, in macchia, in more open parts on rocky stony ground, no. 2284.

Large clumps with thick stems.

Distribution : N. E. Italy ; Greece, Thessaly, Albania, S. Macedonia, Thrace, Montenegro, Hercegovina, Dalmatia, S. Croatia, Istria.

There seems to be no constant morphological differences between this species and *E. Sibthorpii* Boiss. Cent. Euph, 39 (1860). Hayek (Prodr. **1,** 129 : 1924) reduces *E. Sibthorpii* to a variety of *E. veneta*, but the differential characters relied upon by him and by Halácsy (Consp. Flor. Graec. **3,** 104 : 1904, as species) are not exhibited by the extensive series of specimens at Kew. The leaves, the involucral lobes, and the glands (the last two seen on dissection) show only individual fluctuations. Thus *E. veneta* from the type area has bifid involucral scales.

Lauraceae.

Laurus nobilis *L.* Sp. Pl. 369 (1753).

Above Panteleëmon, 14.4.34, in high macchia, no. 2269.

Distribution : Mediterranean Region, Caucasus ; Mediterranean districts of the Balkan Peninsula.

Thymelaeaceae.

Daphne Laureola *L.* Sp. Pl. 357 (1753).

Above Karyes, 14.4.34, in *Castanea* woods, no. 2274.

Distribution : Central Europe ; Greece, Thessaly, N. and S. Macedonia, Serbia, Bosnia, S. Croatia, Istria.

D. oleoides *Schreb.* var. **glandulosa** (*Bertol.*) *Keissl.* in Engl. Bot. Jahrb. **25,** 49 (1898).

Mt. Athos peak, 12.7.34, 1700 m., rocky places and rock crevices, *H. G. Tedd* no. 1492.

Perianths white, fruits red ; small bushy shrub.

Distribution (of species) : Mediterranean Region, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

LORANTHACEAE.

Viscum laxum *Boiss. et Reut.* Diagn. Pl. Hisp. 16 (1842) var. **Abietis** (*Wiesb.*) *Hayek* Flor. Steierm. **1**, 188 (1908).

High above Simopetra, on way to Karyes, 13.4.34, no. 2301, parasitic on *Abies* no. 2302.

Distribution (of species): E. N. Temperate Region; Crete, Greece, Thessaly, S. Macedonia, Bosnia, Hercegovina, S. Croatia.

URTICACEAE.

Parietaria cretica *L.* Sp. Pl. 1052 (1753).

Mulyani Islands: small island opposite Pyrgos, 13.4.34, amongst rocks, coll *H. G. Chick*, no. 2600.

Distribution: Linosa; Crete, Greece, Cyclades.

The identification is not quite certain since the specimens are small and depauperated and the flowers are young.

P. lusitanica *L.* Sp. Pl. 1052 (1753).

Chilandari, on walls, 22.4.34, no. 2670.

Distribution: Mediterranean Basin east to Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

P. vulgaris *Hill* Brit. Herb. 491 (1756) see Druce in B.E.C. 1913 Rep. 439 (1934). *P. ramiflora* Moench Meth. 327 (1794).

Near Vatopedi, 22.4.34, on walls, no. 2668.

Distribution: Central Europe, Mediterranean Region, Caucasus; widespread in the Balkan Peninsula.

PLATANACEAE.

Platanus orientalis *L.* Sp. Pl. 999 (1753).

Near Chilandari Arsenal, 22.4.34, abundant and forming the dominant species of a wood in a dry stream bed, no. 2683; fruits collected above Panteleëmon, 14.4.34, as K.1451 and in dry stream beds near Chilandari Arsenal, 22.4.34, as K.1485; seedlings from K.1485 cultivated in the Herbarium Ground, Kew, 19.7.35.

Distribution: Oriental; southern and Transitional districts of the Balkan Peninsula.

CUPULIFERAE.

Ostrya carpinifolia *Scop.* Flor. Carn. ed. 2, **2**, 244 (1772).

Above Lavra, 620 m., in woods, 20.4.34, in woods in *Abies* zone, no. 2520.

Distribution: Central Europe, Oriental, Caucasus; general in the Balkan Peninsula, not in Crete.

Quercus coccifera *L.* Sp. Pl. 995 (1753).

Near Chilandari, 22.4.34, in macchia, no. 2678, small tree, 5 m. high; Mulyani Islands: small island off Pyrgos, 15.4.34, with Kermes galls and male flowers, no. 2768.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

Q. conferta *Kit*, in Schult. Öst. Flor. ed. 2, **1**, 619 (1814).

Near Chilandari, 23.4.34, tree in macchia, no. 2696.

Distribution: Balkan Peninsular type; widespread in the Balkan Peninsula, but not in Crete.

Q. Ilex *L.* Sp. Pl. 995 (1753).

Below Zographu Monastery, 16.4.34, tree in macchia, no. 2420.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

Q. lanuginosa (*Lam.*) *Thuill.* Flor. Par. ed. 2,502 (1799).

Above Panteleëmon, 14.4.34, in woods near the higher limit of the macchie, no. 2270.

Distribution: Central Europe, Mediterranean Basin east to Caucasus; general in the Balkan Peninsula.

SALICACEAE.

Populus nigra *L.* Sp. Pl. 1034 (1753) var. **italica** *Duroi* Harbk. Baumz. **2,** 141 (1772); Hayek Prodr. **1,** 81 (1924)?

Between Chilandari and Pyrgos, 23.4.34, on the plateau, no. 2688.

Greek name "Leuke." Grey-white trunk. A tall fastigiate female tree.

Distribution (of species): N. Temperate Region; widespread in the Balkan Peninsula.

Houtzagers: Het Gaslacht Populus, 52, 224 (1937) would apparently consider this *P. nigra* var. *typica* ♀ × *P. nigra* var. *italica* ♂.

Salix alba *L.* Sp. Pl. 1021 (1753).

Near Chilandari Arsenal, 22.4.34, in dry stream bed, no. 2685.

Distribution: N. Temperate Region; general in the Balkan Peninsula.

ORCHIDACEAE.

Cephalanthera longifolia (*L.*) *Fritsch* in Oesterr. Bot. Zeitschr. **38**, 81 (1888).

Near Zographu Arsenal, 16.4.34, stony ground, no. 2416.

Distribution: E. N. Temperate Region; widespread in the Balkan Peninsula, but not in Crete.

Neotinea intacta (*Lk.*) *Reichb.* De poll. Orch. 29 (1852).

Hills behind Pyrgos, 11.4.34, in macchia, coll. *H. G. Chick*, no. 2668.

White flowers.

Distribution: W. Europe and Mediterranean Basin; Crete, Greece, Thessaly, Corfu, Dalmatia.

Ophrys lutea *Cav.* Icon. **2,** 46, t. 160 (1793) var. **minor** *Parl.* Flor. It. **3,** 558 (1858).

Near Pyrgos, 1934, *Mrs. Loch* no. 29.

Distribution (of species): Mediterranean Basin; Mediterranean districts of the Balkan Peninsula.

O. Reynholdii *H. Fleischm.* in Osterr. Bot. Zeitschr. **57,** 5, t. III (1907).

Near Chilandari Arsenal, 22.4.34, sandy field, in shade of brushwood, no. 2686.

Sepals pink; two white patches on labellum which was seal-skin chocolate in colour.

Distribution: This interesting species was described originally from Corfu and Mt. Hymettus, Greece. According to Keller and Soó in Keller und Schlechter, Monogr. und Iconogr. Orchid. Eur. Mittelmeergeb. **2,** 60 (1931), Renz in 1929 found it on Mt. Prophet Elias, Rhodes.

Orchis laxiflora *Lam.* Flor. Fr. **3,** 504 (1778).

Near Xerxes Canal, 17.4.34, damp ground, on the site of the Canal, no. 2437.

Flowers dark red-purple.

Distribution: Central Europe, Mediterranean Region, Caucasus; widespread in the Balkan Peninsula.

O. Morio *L.* Sp. Pl. 940 (1753) subsp. **picta** (*Lois.*) *Asch. et Graebn.* Syn. Flor. Mitt.-Eur. **3,** 667 (1907).

Sithonia (Longos) Peninsula, 19.4.34, coll. *H. G. Chick* and *H. G. Tedd*, no. 2622.

Distribution (of species): E. N. Temperate Region; general in the Balkan Peninsula, but not in Crete.

O. provincialis *Balb.* Misc. alt. 33 (1806).

Near Zographu Arsenal, 16.4.34, no. 2412.

Flowers cream. Labellum with reddish-brown spots in two or three longitudinal lines. Leaves spotted.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

O. quadripunctata *Cyr.* in Ten. Pr. flor. Nap. LIII (1811–15).

Between Kapsokalývia and Lavra, 19.4.34, dry slopes in macchia, no. 2479.

Flowers rose-purple, labellum trilobed with a few spots at base. Leaves spotted.

Distribution: Mediterranean Basin; Mediterranean and Transitional districts of the Balkan Peninsula.

O. romana *Seb.* Roman. Plant. fasc. **1,** 12 (1813) var. floribus purpureis.

High above Karyes, 700 m., 13.4.34, in open bushy ground on top of the ridge, no. 2281.

Deep purple flowers. This is the so-called lusus *tenuifolia* (C. Koch) Soó in Fedde Rep. **24,** 30 (1927) and Bot. Archiv. **23,** 62 (1928).

O. romana *Seb.* var. floribus luteis.

Growing with the last, no. 2280.

Flowers very pale yellow and not spotted. This is the so-called lusus *flavescens* (C. Koch) Soó. l.c.

Distribution (of species): Mediterranean Region; Greece, N. and S. Macedonia, Thrace, N. Bulgaria, Rodope Massif, Serbia, Dalmatia.

O. Simia *Lam.* Flor. Fr. **3,** 507 (1778).

Above the Roumanian Prodromos Skete, 19.4.34, dry bushy slopes, not limestone, no. 2494.

Distribution: General European, Oriental, Caucasus; fairly widespread in the Balkan Peninsula.

O. tridentata *Scop.* Flor. Carn. ed. 2, **2,** 190 (1772).

Between Kapsokalývia and Lavra, 19.4.34, dry slopes in macchia, no. 2481.

Distribution: Central Europe, Mediterranean Basin east to Caucasus; widespread in the Balkan Peninsula.

Serapias laxiflora *Chaub.* in Chaub. et Bory Flor. Pelop. 62 (1838).

On plateau between Chilandari and Pyrgos, 23.4.34, in grassland, no. 2690.

Distribution: Mediterranean Basin; Crete, Greece, Thessaly, Thrace, Istria.

S. vomeracea (*Burm.*) *Briqu.* Prodr. Flor. Cors. **1,** 378 (1910).

Near Iviron, 20.4.34, bare ground in macchia zone, no. 2545.

Flowers deep brick-red.

Distribution: Mediterranean Region; Mediterranean and Transitional districts of the Balkan Peninsula.

AMARYLLIDACEAE.

Galanthus nivalis *L.* Sp. Pl. 288 (1753).

Slopes of Mt. Athos. on eastern side, high above Lavra, 800 m., 20.4.34, stony places in shade in *Abies* forest, no. 2526.

The plants are tall, with long leaves and large flowers. On the characters given by Hayek (Prodr. **3,** 101: 1932) it is to be placed under the var. *maior* Ten. A bulb is in cultivation in the Herbarium Ground, Kew, and in February, 1935, produced one flower which approximated more to typical *G. nivalis*. It is possible that the giant condition of the original specimens is due essentially to habitat conditions.

Distribution: Central Europe, Caucasus; widespread in the Balkan Peninsula, but not in Crete.

IRIDACEAE.

Gladiolus segetum *Ker-Gawl* in Bot. Mag. t. 719 (1804).

Near Xenophontos, 18.4.34, in stony macchia, no. 2501; hills behind Pyrgos, 6.6.34, *Mrs. Loch* no. 13.

Distribution: Mediterranean Region, Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

The specimens are young and the identification is not quite certain. The bracts and inflorescence are those of *G. segetum* but the flowers are smaller than usual in this species and the authers slightly shorter. There is some convergence of characters to those of *G. illyricum* Ker-Gawl.

Iris Reichenbachii *Heuff.* in Oesterr. Bot. Zeitschr. **8,** 28 (1858).

Simopetra, just above the arsenal, 13.4.34, stony sunny open places in macchia, No. 2362.

Very acutely keeled spathes. Tepals deep violet-purple.

Distribution: Hungary; central and northern districts of the Balkan Peninsula.

Romulea Linaresii *Parl.* Flor. Panorm. **1,** 38 et Flor. Ital. **3,** 246 (1858).

Between Simopetra and Karyes, 620 m., 13.4.34, no. 2322.

Flowers violet-purple.

Distribution: Mediterranean Basin (essentially); Crete, Greece, Cyclades, Thessaly, S. Macedonia, Thrace.

Dioscoreaceae.

Tamus communis *L.* Sp. Pl. 1028 (1753) var. **cretica** (*L.*) *Boiss.* Flor. Or. **5,** 344 (1882).

Below Zographu, 16.4.34, in high macchia, no. 2408.

Distribution (of species): Central Europe, Mediterranean Region, Caucasus; widespread in the Balkan Peninsula.

Liliaceae.

Allium margaritaceum *S. et S.* Prodr. **1,** 224 (1806) et Flor. Graec. **4,** t. 315 (1823).

Cultivated in the Herbarium Ground, Kew, in flower 24.8.36, as K.1393, from bulbs collected between Simopetra and Karyes, 13.4.34.

A large variety or form of the species which may be, *e descriptione*, var. *confusum* (Hal.) Hayek, Prodr. **3,** 41 (1932). The flowering stem is up to 8 dm. high and the antheriferous cusp of the tricuspidate filaments is only slightly shorter than the lateral ones. The inflorescence is 5 cm. in diam. The variety was described, from Thessaly: "prope Malakasi, monasterium Korona (Hausskn.), in fauces Karava (Sint)," in Hal. Consp. **3,** 244 (1904), pro sp.

Distribution (of species): Mediterranean Region, Caucasus; widespread in the Balkan Peninsula.

Allium trifoliatum *Cyr.* Pl. rar. Neap. **2,** 11, t. 3 (1792).

Between Lavra and its Arsenal, 20.4.34, no. 2514.

Tepals white with purplish mid-vein.

Distribution: E. Mediterranean Basin; Crete, Greece, Cyclades.

Fritillaria pontica *Wahlenb.* in Isis **21,** 984 (1828).

Karyes, 14.4.34, grassy semi-shady banks, no. 2272; above Simopetra, 13.4.34, in high macchia, no. 2313; on eastern slopes of Mt. Athos, high above Lavra, 800 m., 20.4.34, dampish places in *Abies* forest, no. 2527; hills behind Pyrgos, 11.4.34, coll. *H. G. Chick*, no. 2615.

Distribution: E. Mediterranean Basin; N. and S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif.

Gagea amblyopetala *Boiss. et Heldr.* in Boiss Diagn. **1,** vii, 107 (1846).

Between Simopetra and Karyes, 620 m., 13.4.34, grassy, semi-shady place, no. 2323.

Yellow tepals.

Distribution: Asia Minor; Greece, Thessaly, S. Macedonia, Thrace.

Muscari racemosum (*L.*) *Mill.* Gard. Dict. ed. 8 (1768) sensu Hayek Prodr. **3,** 9 (1932).

Below Zographu Monastery, 16.4.34, stony ground in macchia, no. 2424; Mikra Cemetery, north of Salonika, 11.4.34, dry stony ground, no. 2618; hills above Pyrgos, 25.4.34, no. 2620.

Distribution: W. Europe, Mediterranean Region, Caucasus; general in the Balkan Peninsula.

M. tenuiflorum *Tausch* in Flora **24,** 234 (1841).

Mulyani Islands: small rocky island opposite Pyrgos, 13.4.34, collected by *H. G. Chick*, no. 2619; and 25.4.34, no. 2765.

Leaves broad. Perianth violet.

Distribution: Pannonian, Pontic, Caucasus; Greece, N. Macedonia, N. and S. Bulgaria, Dobruja, Bosnia.

M. tenuiflorum is very doubtfully specifically distinct from *M. comosum* (L.) Mill. It is connected by a series of intergrades such as *M. Charrelii* Hal.

Ornithogalum pyramidale *L.* Sp. Pl. 307 (1753) subsp. **narbonense** (*L.*) *Aschers. et Graebn.* Syn. **3,** 255 (1905).

South-east of Pyrgos, 24.4.34, bare ground near the sea, no. 2718.

Flowers greenish-white.

Distribution (of species): Mediterranean Basin; widely spread in the Balkan Peninsula.

O. tenuifolium *Guss.* Prodr. Flor. Sic. **1,** 413 (1827).

Near Lavra, 19.4.34, in stony ground in macchia zone, no. 2500.

Distribution: S. Europe, Caucasus; general in the Balkan Peninsula.

Ruscus Hypoglossum *L.* Sp. Pl. 1041 (1753).

Above Karyes, 680 m., 14.4.34, in shady woods of *Castanea*, no. 2308.

Distribution: S. Europe, Pontic; S. Macedonia, Athos Peninsula, Thrace, N. and S. Bulgaria, Rodope Massif, Serbia, Bosnia, Hercegovina, Dalmatia, S. Croatia, Istria.

Scilla autumnalis *L.* Sp. Pl. 309 (1753).

Mulyani Islands: larger island opposite Pyrgos, 4.10.34, *Mrs. Loch* no. 9.

Distribution: W. Europe, Mediterranean Basin east to the Caucasus; general in the Balkan Peninsula.

S. bifolia *L.* Sp. Pl. 309 (1753).

High above Simopetra, on way to Karyes, 620 m., 13.4.36, shady places in *Abies* and *Castanea* woods, no. 2300.

Blue tepals. Lush growing specimens with up to more than 20 flowers in a raceme.

Distribution: Central Europe, Mediterranean Basin east to the Caucasus; general in the Balkan Peninsula.

Smilax aspera *L.* Sp. Pl. 1028 (1753) subsp. **eu-aspera** *Hayek* Prodr. **3,** 99 (1932).

Above Chilandari, 23.4.34, in macchia, no. 2698.

S. aspera *L.* subsp. **mauritanica** (*Desf.*) *Aschers. et. Graebn.* Syn. **3,** 323 (1906).

Between Stavronikita and Pantokratoros, 21.4.34, on slopes above the sea, in macchia on mica-schist, no. 2555; near Vatopedi, 13.7.34, climber in macchia near sea, very few fruits seen, no. 1533.

Distribution (of species): Mediterranean Region; Mediterranean and Transitional districts of the Balkan Peninsula.

Araceae.

Arisarum vulgare *Targ. Tozz.* in Ann. Mus. fis. Flor. **2**, 2.66 (1810).

Mulyani Islands: Pontiko Island, 20.6.34, *Mrs. Loch* no. 35; Simopetra, above the arsenal, 13.4.34, dry places amongst vegetation, no. 2366.

Distribution: Mediterranean Region; Crete, Greece, Cyclades, Thessaly, Corfu, Dalmatia, S. Croatia.

Arum orientale *M. Bieb.* Flor. Taur.-Cauc. **2,** 407 (1808) subsp. **elongatum** (*Stev.*) *Engl.* Pflanzenr. IV 23 F, 79 (1920).

Between Kapsokalývia and Lavra, 19.4.34, dry bushy slopes in macchia, no. 2486.

Spathe dark chocolate except at the greenish base. Leaves veined but not with white and not spotted. Spadix chocolate coloured or yellowish.

Distribution (of species) : E. Mediterranean Basin, Pontic, Caucasus ; Greece, Cyclades, S. Macedonia, Thrace, S. Bulgaria, Montenegro, Hercegovina, Dalmatia.

NAIADACEAE.

Posidonia oceanica (*L.*) *Del.* Flor. Aeg. Ill. 30 (1813).

Near Isphigmenou, 22.4.34, leaves cast up in considerable quantities on the shore, no. 2767.

Distribution : Mediterranean Basin ; Mediterranean coastal districts of the Balkan Peninsula.

JUNCACEAE.

Juncus bufonius *L.* Sp. Pl. 328 (1753).

Near Xerxes Canal, 17.4.34, damp ground by the sea, no. 2463.

Distribution : cosmopolitan ; general in the Balkan Peninsula.

Luzula Forsteri (*Sm.*) *Lam. et DC.* Syn. plant. flor. Gall. 150 (1806).

Above Karyes, 14.4.34, banks in *Castanea* woods, no. 2277.

Distribution : W. Europe, Mediterranean Region, Caucasus ; widespread in the Balkan Peninsula.

CYPERACEAE.

Carex distans *L.* Syst. ed. 10, 1263 (1759) sensu Kükenthal in Engl. Pflanzenr. IV 20, 663 (1909).

Belween Chilandari and Pyrgos, 23.4.34, damp spot on Plateau, no. 2687.

Distribution : General European, Mediterranean Region, Caucasus ; widespread in the Balkan Peninsula.

C. distachia *Desf.* Flor. Atl. **2,** 336 (1798).

Dionysiou, 18.4.34, on rocks above the monastery, no. 2506.

Distribution : Mediterranean Region ; Greece, Corfu, N. and S. Macedonia, Athos Peninsula, Thrace, Montenegro, Hercegovina, Dalmatia, Istria.

C. divisa *Huds.* Flor. Angl. 348 (1762) var. **chaetophylla** (*Steud.*) *Daveau* in Cyp. Port. 47 (1792) sec. Kükenthal in Engl. Pflanzenr. IV. 20, 126 (1909).

Between Stavronikita and Pantokratoros, 21.4.24, damp spot in macchia on mica-schist slopes, no. 2550.

Distribution (of species) : General European, Mediterranean Region, Caucasus and east to the Himalayas, also in S. Africa ; widespread in the Balkan Peninsula.

Carex flacca *Schreb.* Spic. Flor. lips. App. no. 669 (1771) var. **cuspidata** (*Host,* pro sp., Gram. Austr. **1,** 71, t. 97 : 1801).

Between Pyrgos and Xerxes Canal, 17.4.34, dry macchia near the shore, no. 2438.

Distribution (of species) : Central Europe and Mediterranean Region ; widespread in the Balkan Peninsula.

Heleocharis palustris (*L.*) *R. Br.* Prodr. Flor. Nov. Holl. 224 (1810).

Between Pyrgos and Xerxes Canal, 17.4.34, marshy ground, no. 2456.

Distribution : E. N. Temperate Region (and S. Africa) ; general in the Balkan Peninsula.

Scirpus setaceus (*L.*) *Palla* in Hall.-Wohlf.-Koch Syn. ed. 3, 2538 (1905).

South-east of Pyrgos, 23.4.34, damp spot in macchia, no. 2712.

Distribution : N. Temperate Region ; widely spread in the Balkan Peninsula, but not in Crete.

Agropyron sanctum (*Janka*) *Hack.* ap. Form. Verhl. Naturw. Ver. Brünn **35,** 157 (1896). *Festuca sancta* Jka. in Oester. Bot. Zeitschr. **21,** 250 (1871).
Mt. Athos peak, 12.7.34, 1700 m., rocks, *H. G. Tedd* no. 1522.
Up to about 6·1 dm. high.
Distribution : Thessaly, Athos Peninsula.

Aira capillaris *Host* Gram. Austr, **4,** 20, t. 35 (1809).
Hills behind Pyrgos, 11.6.34, *Mrs. Loch* no. 1 ; near Stavronikita, 21.4.34, in macchia on mica-schist slopes, no. 2548 ; near Pyrgos, 24.4.34, stony ground, no. 2749.
Distribution : Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

Anthoxanthum odoratum *L.* Sp. Pl. 28 (1753).
Plateau between Chilandari and Pyrgos, 23.4.34, in grassland, no. 2701.
Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

Avena barbata *Gott.* ap. Link in Schrad. Journ. Bot. **2,** 315 (1799).
Mulyani Islands : small island opposite Pyrgos, 15.4.34, in brushwood, no. 2394.

A. barbata *Gott.* var. **Wiestii** (*Steud.*) vide Hausskn. in Mitt. Thür. Bot. Ver. N. F. **13,** 48 (1899).
Near Pyrgos, 24.4.34, stony ground, no. 2748.
Distribution (of species) : Mediterranean Region, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

Briza maxima *L.* Sp. Pl. 70 (1753).
Mulyani Islands : small island opposite Pyrgos, stony ground, collected *H. G. Chick*, no. 2578.
Distribution : N. Temperate Region ; Mediterranean and Transitional districts of the Balkan Peninsula.

Bromus fibrosus *Hack.* in Oesterr. Bot. Zeitschr. **29,** 207 (1879).
Mt. Athos peak, 12.7.34, 1700 m., rocky places, *H. G. Tedd* no. 1525.
Distribution : Balkan Peninsular type ; Greece, Thessaly, N. Macedonia, Athos Peninsula, N. and S. Bulgaria, Rodope Massif, Serbia, Bosnia, Dalmatia, S. Croatia.

B. scoparius *L.* Cent. pl. **1,** 6 (1755).
Near Chilandari, 22.4.34, in enclosed pasture, no. 2676.
Distribution : Mediterranean Region, Caucasus ; Mediterranean and Transitional districts of the Balkan Peninsula.

B. sterilis *L.* Sp. Pl. 77 (1753).
Near Kapsokalývia, 19.4.34, on limestone scree slopes above the sea, no. 2488.
Distribution : E. N. Temperate Region ; general in the Balkan Peninsula.

B. tectorum *L.* Sp. Pl. 77 (1753).
Between Chilandari and Pyrgos, 23.4.34, grassland on the plateau, no. 2703.
Distribution : Central Europe, Mediterranean Region, Caucasus ; general in the Balkan Peninsula.

Catapodium loliaceum (*Huds.*) *Lk.* Hort. Berol. **1,** 45 (1827).
Mulyani Islands : small island opposite Pyrgos, 25.4.34, stony grassy ground, no. 2762.
Distribution : W. Europe, Mediterranean Region ; Crete, Greece, Corfu, Thrace, Montenegro, Hercegovina, Dalmatia, S. Croatia, Istria.

Dactylis glomerata *L.* Sp. Pl. 71 (1753).
Mt. Athos peak, 12.7.34, 1900 m., rock crevices, *H. G. Tedd* no. 1513.
Grows to 3 and 4·6 dm. in height.
Distribution : N. Temperate Region ; general in the Balkan Peninsula.

D. glomerata *L.* var. **hispanica** (*Roth*) *Koch.* Syn. 808 (1837).
Mulyani Islands: small island opposite Pyrgos, stony grassy places, no. 2260.

Holcus setiglumis *Boiss. et Reut.* Diagn. hisp. 27 (1842).
Between Chilandari and Pyrgos, 23.4.34, grassland on plateau, no. 2702.
Distribution: Mediterranean Region; Cyclades.

Hordeum leporinum *Link* in Linnaea **9,** 133 (1835).
Between Chilandari and Pyrgos, 23.4.34, grassland on plateau, no. 2704.
Distribution: Mediterranean Region; widely spread in the Balkan Peninsula, but not in Crete.

Imperata cylindrica (*L.*) *P. Beauv.* Ess. Agr. 7–8, 165 (1812).
Near Pyrgos, 23.4.34, sandy bank near the sea, no. 2706.
Distribution: cosmopolitan (warm regions); Mediterranean and Transitional districts in the Balkan Peninsula.

Koeleria splendens *Presl* Gram. et Cyp. Sic. 34 (1820).
Mr. Athos peak, 1700 m., 12.7.34, among rocks, *H. G. Tedd* no. 1534.
Distribution: Mediterranean Basin; widespread in the Balkan Peninsula but not in Crete or the Cyclades.

Lagurus ovatus *L.* Sp. Pl. 81 (1753).
Near Stavronikita, 21.4.34, bare stony ground near the monastery, no. 2563.
Distribution: Mediterranean Basin east to the Caucasus; Mediterranean and Transitional districts of the Balkan Peninsula.

Lolium strictum *Presl* Cyp. et Gram. Sic. 49 (1820).
Mulyani Islands: small island opposite Pyrgos, 25.4.34, stony grassy places, no. 2761.
Distribution: Mediterranean Region; Greece, Cyclades, Corfu, Albania, Dalmatia, S. Croatia, Istria.

Melica minuta *L.* Mant. 32 (1767).
Above Simopetra, 13.4.34, dry stony ground, no. 2345; Kapsokalývia, 19.4.34, among stones on hot dry slopes, no. 2472.
Distribution: Mediterranean Basin; Crete, Greece, Cyclades, Corfu, Athos Peninsula, Dalmatia.

M. uniflora *Retz.* Obs. **1,** 10 (1779).
Above Lavra, on slopes of Athos peak, 770 m., in stony ground in *Abies* zone, no. 2516.
Distribution: Central Europe, Pontic, Caucasus; general in the Balkan Peninsula.

Poa alpina *L.* Sp. Pl. 67 (1753).
Mt. Athos peak, 12.7.34, 1700–1900 m., rocky places, *H. G. Tedd* no. 1514.
Nodes black.
Distribution: N. Temperate Region; widely spread in the Balkan Peninsula, but not in Crete.

P. bulbosa *L.* Sp. Pl. 70 (1753).
Between Pyrgos and Xerxes Canal, 17.4.34, stony ground in macchia, no. 2460.
Distribution: N. Temperate Region; widespread in the Balkan Peninsula.

Psilurus aristatus (*L.*) *Duv. Jouv.* in Bull. Soc. Bot. Fr. **13,** 132 (1866).
South-east of Pyrgos, 24.4.34, among bushes by the sea, no. 2742.
Distribution: Mediterranean Region; general in the Balkan Peninsula.

Coniferae.

Abies. Mattfeld uses the name *A. Borisii-regis* in a series of papers, of which it is only necessary here to refer to that in Bibl. Bot. Heft 100 (1930), for the polymorphic population showing intermediate characters between *A. alba* and

A. cephalonica and characters of these species in various combinations. Mattfeld argues strongly that the population arose through hybridization of *A. alba* and *A., cephalonica*, but another possibility is that it represents an earlier evolutionary condition from which *A. alba* separated northwards and *A. cephalonica* southwards through loss of different genes and consequent purification. If the name *A. Borisii-regis* be used it is probably best to use it (as does Mattfeld l.c.) as a convenient designation for a mixed population and not as the name of a species co-equivalent to *A. alba* and *A. cephalonica*. Some specimens, at least, from the Rodope Massif can equally well be placed, varietally, under *A. alba*, and the material from Athos enumerated below can be placed under *A. cephalonica*.

The following plants were collected :

High above Lavra, on the slopes of Athos peak, at about 310 m., 20.4.34, in fir forest (locally pure, but sometimes mixed with deciduous trees) :
No. 2535, resinous buds, glabrous shoots, leaves obtuse, 0·7–3·0 cm. long.
No. 2536, resinous buds, glabrous shoots, leaves subobtuse, 1·3–3·0 cm. long.
No. 2537, strongly resinous buds, glabrous shoots, leaves obtuse and even slightly retuse to strongly acute (on the same tree), 1·8–3·3 cm. long.
No. 2538, strongly resinous buds, glabrous shoots, leaves mostly obtuse, 0·8–3·5 cm. long.
No. 2539, strongly resinous buds, glabrous shoots, leaves obtuse to subacute, 1·3–2·5 cm. long.
No. 2540, resinous buds, glabrous shoots, leaves mostly rounded at the apex or very slightly retuse, 1·5–2·8 cm. long.
No. 2541, buds rather slightly resinous, shoots glabrous, leaves subobtuse and sometimes slightly retuse, 1·1–3·0 cm. long.
No. 2542, buds scarcely resinous, shoots glabrous, leaves subacute, frequently retuse, 0·6–2·8 cm. long.
No. 2543, buds scarcely resinous, shoots glabrous, leaves acute to strongly acute, 1·4–2·5 cm. long.

Between Simopetra and Karyes, 13.4.34, in fir wood :
No. 2278, resinous buds, glabrous shoots, leaves acute, 2·0–2·9 cm. long.
No. 2279, slightly resinous buds, glabrous shoots, leaves sharply acute, 2·4–4·0 cm. long.

High above Simopetra, on way to Karyes, 13.4.34, in fir wood :
No. 2302, slightly resinous buds, glabrous shoots, leaves obtuse to rounded, frequently slightly retuse, 0·6–2·4 cm. long. Host of *Viscum*, No. 2301.

High above Simopetra, on way to Karyes, 13.4.34, 700 m., in fir wood :
No. 2312, strongly resinous buds, glabrous shoots, obtuse or truncate and often very slightly retuse on the flowering branches to acute on older branches, 1·5–2·0 cm. long.

Cupressus sempervirens *L.* Sp. Pl. 1002 (1753) var. **pyramidalis** (*Targ. Tozz.*) *Nym.* Consp. 675 (1878).

Near Zographu Monastery, 16.4.34, planted near the monastery grounds, no. 2769.

Distribution (of species) : Oriental ; Crete, Greece, Albania, Athos Peninsula, Thrace (often cultivated).

Juniperus oxycedrus *L.* Sp. Pl. 1038 (1753).

Between Chilandari and Pyrgos, 23.4.34, in macchia on the hills, about 160 m., no. 2710 ; between Karyes and Simopetra, 13.4.34, in pine woods, 200 m., no. 2311.

Distribution : Mediterranean Basin east to the Caucasus ; widespread in the Balkan Peninsula.

Pinus halepensis *Mill.* Gard. Dict. ed. 8 (1768).

Sithonia (Longos) Peninsula, 19.4.34, rocky hills, *H. G. Tedd* no. 1367, and near Armisti, coll. *H. G. Chick and H. G. Tedd*, no. 2562A. Forming forest where not destroyed by fire, and where this has happened apparently slowly regenerating. Head of Cassandra Gulf, W. of Nikitas, 12.4.34, tall trees in

mixed macchia, a hundred metres from the shore, nos. 2571, 2572, 2573, 2573A ; hill-slopes above Chilandari, in thick pine forest with macchia undergrowth, 23.4.34, no. 2697 ; between Chilandari and Pyrgos, 23.4.34, in open pine wood on plateau and ridge with *Erica arborea* macchia as undergrowth, nos. 2563A, 2564, 2565, 2566, 2567, 2568.

Distribution : Mediterranean Basin east to Caucasus ; Mediterranean districts of the Balkan Peninsula.

P. pinea *L.* Sp. Pl. 1000 (1753).

On high plateau (ridge) between Chilandari and Pyrgos, 23.4.34, scattered trees here and there subordinate to *P. halepensis* and with *Erica arborea* macchia as undergrowth, nos. 2569, 2570, 2695.

Distribution : Mediterranean Basin east to Caucasus ; southern Mediterranean districts of the Balkan Peninsula.

Gnetaceae.

Ephedra campylopoda *C. A. Mey.* Vers. Mon. Eph. 73 (1846).

Pyrgos, 5.12.34, *Mrs. Loch* no. 20; Mulyani Islands : Pontiko Island, 15.4.34, growing in rock crevices overlooking the sea, no. 2401. Not in flower, but of low trailing growth.

Distribution : E. Mediterranean Basin ; Mediterranean and Transitional districts of the Balkan Peninsula.

Vascular Cryptogams.

Adiantum Capillus-Veneris *L.* Sp. Pl. 1096 (1753).

Below Zographu Monastery, 16.4.34, shady damp places in macchia, no. 2431.

Asplenium Adiantum-nigrum *L.* Sp. Pl. 1081 (1753).

Simopetra, between the monastery and the arsenal, 13.4.34, shady stony bank, no. 2293.

A. lanceolatum *Huds.* Flor. Angl. ed. 2, **2,** 454 (1778) var. **obovatum** (*Viv.*) *Moore* Ind. fil. **2,** 140 (1857).

Near Dionysiou, 18.4.34, on shady rocks, no. 2465.

A. Trichomanes *L.* Sp. Pl. 1080 (1753).

Above Karyes, 14.4.34, on stones in *Castanea* woods, no. 2276.

Ceterache officinarum *DC.* Flor. Fr. **2,** 566 (1805).

Simopetra, between the arsenal and the monastery, 13.4.34, on rocks, no. 2349.

Cheilanthes pteridioides (*Reichb.*) *C. Chr.* Index Filic. 178 (1905). *C. fragrans* (L.)

Simopetra, between the monastery and the arsenal, 13.4.34, no. 2291.

Cystopteris fragilis (*L.*) *Bernh.* in Schrad. Neu. Jounr. Bot. 1806. **1,** 2.26, 27, tab. 2, fig. 9.

High above Lavra, 800 m., on slopes of Athos peak, 20.4.34, damp shady places in *Abies* forest, no. 2534 ; south of Pyrgos, 24.4.34, shady ground among stones on slopes, no. 2719.

Dryopteris rigida (*Hoffm.*) *Und.* Our Native Ferns ed. 4, 116 (1893) et ed. 6, 114 (1900).

Below Zographu Monastery, 16.4.34, shady and damp places in macchia, no. 2430.

Osmunda regalis *L.* Sp. Pl. 1065 (1753).

Sithonia (Longos) Peninsula, near Armisti, 19.4.34, coll. *H. G. Tedd and H. G. Chick,* no. 2642.

Polypodium vulgare *L.* Sp. Pl. 1085 (1753).

Simopetra, above the arsenal, 13.4.34, shady places on trees, rocks, etc., no. 2365.

Selaginella denticulata (*L.*) *Lk.* Fil. hort. Berol. 159 (1841).

Simopetra, between the monastery and the arsenal, 13.4.34, shady macchia slopes, no. 2295, plants coloured green and reddish ; above Zographu arsenal, 16.4.34, on rocks, no. 2411.

Equisetum Telmateia *Ehrh.* Hann. Mag. 1783, 18.

Between Stavronikita and Pantokratoros, 21.4.34, damp spot in macchia on mica-schist slopes, no. 2553.

XXIV—MISCELLANEOUS NOTES.

The Coronation.—By Command of His Majesty the King medals were forwarded to The Director, to Dr. T. A. Sprague, Deputy Keeper of the Herbarium and Library, and to Sergeant Constable J. Sealy, to be worn in commemoration of their Majesties' Coronation, May 12th, 1937.

Coronation Honours.—We have much pleasure in recording the conferment of the following Honours :—K.C.M.G.—Sir David T. Chadwick, C.S.I., C.I.E., Secretary of the Imperial Economic Committee, and of the Executive Council of the Imperial Agricultural Bureaux ; C.M.G.—Mr. A. J. Findlay, M.A., B.Sc., Director of Agriculture, Zanzibar, and Mr. C. F. M. Swynnerton, Director of Tsetse Research, Tanganyika Territory.

Retirement of Miss A. F. Fitch.—Miss Ada F. Fitch retired from the post of Sub-Assistant in the Herbarium on April 10th, 1937, after forty-five years' service at Kew. Her numerous friends will join in wishing her many years of happy and useful activity. It will be remembered that Miss Fitch's father was W. H. Fitch, the famous botanical artist. It is hoped that Miss Fitch will still be able to give some assistance in the Herbarium work, where her skilful manipulation has been of so much value during her long service at Kew.

Mrs. Bolus.—In K. B. 1937, 121, we recorded the conferment of an honorary degree on Mrs. F. Bolus by the University of Capetown. We now learn that it was Stellenbosch University and not the University of Capetown which has honoured Mrs. Bolus.

Albert William Borthwick.—The death occurred on April 21st, at the age of 64, of Professor A. W. Borthwick, D.Sc., who for many years figured as one of the leading authorities on forestry questions in the British Isles. Professor Borthwick was the third son of the late W. H. Borthwick, Esq., of Crookston and Borthwick Castle. After taking a B.Sc. Degree at the University of St. Andrews, he went to Germany for three years where he studied Forestry, Geology and Agriculture. In 1904 he obtained his Doctorate for a Thesis on a botanical subject. He lectured on Plant Physiology at Edinburgh University for nine years, as Assistant

to the Professor of Botany, and he then followed the late Colonel Bailey as Lecturer on Forestry in the same University. He then became Chief Advisory Forest Officer to the Board of Agriculture for Scotland, and soon after the setting up of the Forestry Commission he became its Chief Research and Education Officer. In 1926 he was appointed Professor of Forestry in the University of Aberdeen, a position he occupied until the time of his death.

Professor Borthwick took a great interest in the work of the Royal Scottish Forestry Society. From 1913 to 1929 he edited the Society's Transactions, only giving up the work to become President of the Society during the years 1930–1931.

Professor Borthwick was a batchelor and a man of very kindly disposition. He was always ready to help all who needed his aid, and he made friends with all with whom he came in contact. He was one of the original members of the Management Committee for the National Pinetum at Bedgebury, but gave up the work when he went to Aberdeen. W. DALLIMORE.

Sand-Binding Grasses in The Falkland Islands.—The planting of marram grass (*Ammophila arenaria* Link) is usually advocated for the consolidation of drifting sands in temperate regions and its use for this purpose in the Falkland Islands has yielded very satisfactory results. The Board of Trade lighthouse at Cape Pembroke, near Stanley, was situated in dismal surroundings. Sand, drifting from a source four or five miles from the light-house, had destroyed practically all the vegetation on the long peninsula and laid waste an area of about 1800 acres. In addition it had almost buried the first floor of the lightkeeper's quarters. In 1905, the late Mr. W. (later Sir William) Allardyce, then Governor of the Islands, after consultation with Sir William Thiselton-Dyer, then Director of Kew, suggested the use of marram grass and sea lyme grass (*Elymus arenarius* L.), for planting on the sands to prevent further drift. Seeds of marram grass were imported, whilst the lyme grass was obtained locally from Peeble Island where it had been established for a number of years. Methodical planting of these grasses was begun by Mr. James Reid, the Forester, about fourteen years ago. Recent photographs show that the planting has been most successful. The drift of sand has stopped and practically the whole area is now covered with the sand-binding grasses. We are indebted to the late Governor, Sir John Middleton, K.C.M.G., K.B.E., for much of the above information and for the accompanying illustrations (Plate VIII). C. E. HUBBARD.

True and False Mahoganies.—Since the publication of the "List of True and False Mahoganies" (K.B. 1936, p. 193) a question has been raised as to the exact significance of the words "true" and "false" when used in this connexion. The present note is intended to remove any ambiguity which may exist owing to different

Marram grass on sands at Cape Pembroke, Falkland Islands.

Marram grass near Lighthouse, Cape Pembroke, Falkland Islands.

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interpretations of these words by botanists, timber merchants and others.

The appellation " true " was restricted to the timbers of the several species of *Swietenia* on purely botanical and historical grounds. The first species to be exploited was *S. Mahogani* Jacq., from Jamaica, Cuba and other West Indian Islands. The timber was known as " Spanish mahogany " but other geographical adjectives, to indicate the place of origin, were used as well. The timber from the mainland of Central America, exploited shortly afterwards, was from *S. macrophylla* King, now known as " Honduras mahogany." These two species were probably the only Swietenias used, at least in any quantity, up to the year 1850. This is evident from a pamphlet entitled " The Mahogany Tree " published in 1851 by Messrs. Chaloner and Fleming, mahogany and timber brokers of Liverpool. Nicaragua, where *S. humilis* Zucc. occurs, is mentioned only as an untouched region. Nor is there any reference to mahogany from Africa. Two mahogany substitutes, *Soymida febrifuga* A. Juss. and *Chloroxylon Swietenia* DC., are mentioned on the authority of an encyclopaedia. Both were placed in the genus *Swietenia* by early botanists, but are of no importance as mahogany substitutes in this country. It is, therefore, evident, that in 1850, both to botanists and to timber merchants, the name " mahogany " meant the wood of a species of *Swietenia*, which can thus be regarded as the " true " or " original " mahogany.

Expansion of the mahogany trade and a gradual depletion of supplies followed slowly on the repeal of the import duties in 1845. A large number of timbers were offered later as mahogany substitutes. Many of these are inferior to mahogany in strength, durability and other qualities, and do not even belong to the mahogany family (*Meliaceae*). Their substitution should be discouraged if mahogany is to retain its position as one of the most popular timbers for cabinet work.

It remains to consider whether the trade use of the name " mahogany " can be extended to the timbers of any other genus without prejudice to the good name of the true mahoganies. The only timbers of high quality (besides *Swietenia*) that are widely marketed under the name " mahogany " belong to the genus *Khaya* and are known as " African " mahoganies. Only this genus, which belongs to the *Meliaceae* and is closely related botanically to *Swietenia*, will therefore be discussed in this connexion.

The timbers of several species are imported in large amounts from West Africa both to this country and to the U.S.A. The more important are *K. ivorensis* A. Chev., *K. anthotheca* C. DC. and *K. grandifoliola* C. DC. The timber is of high quality, resembling *Swietenia* mahoganies very closely in colour, mechanical properties, durability and microscopic structure. The two genera are distinguished from one another by relatively small differences. In view of these facts, there can be no reasonable objection to the use of

" mahogany " as a trade description for *Khaya* timbers, providing the usual trade practice of prefixing a geographical adjective is followed. The argument that *K. senegalensis* A. Juss., formerly a source of West African mahogany, was at one time placed in the genus *Swietenia* is of no value in this connexion, since this applies also to plants now classified in the following genera of the *Meliaceae*: *Cedrela, Chloroxylon, Entandrophragma, Chickrasia* and *Soymida*.

Sedum paraguayense (*N. E. Br.*) *Bullock*, comb. nov.—*Cotyledon paraguayensis* N.E. Br. in Kew Bull. 1914, 208.—*Byrnesia Weinbergii* Rose in Addisonia, **7,** t. 243 (1922). *Sedum Weinbergii* (Rose) A. Berger in Engl. et Prantl, Nat. Pflanzenfam. ed. 2, **18a,** 446 (1930); v. Poelln. in Fedde, Repert. **39,** 263 (1936). *Echeveria Weinbergii* Hort.; Theodosia B. Shepherd, Descript. Cat. 34 (1912), nomen nudum.—*Echeveria paraguayensis* Hort.; v. Poelln. *l.c.*, sub spp. excl.—*Echeveria arizonica* Hort.; Rose, *l.c.* et A. Berger, *l.c.* in syn.

The reference of this plant to the genus *Sedum* is perhaps debatable. Fröderström does not mention it in his recent account of the genus (in Acta Horti Gothob. **5** Appendix: 1930–35), but Berger and v. Poellnitz, as indicated above, include it. The cohesion of the petals apparently led the late Dr. N. E. Brown to describe the plant as a species of *Cotyledon*, and the same character induced Rose to describe his genus *Byrnesia*. There seems to be no reason, however, to suppose that this character alone is of generic importance.

The origin of the plant is unknown; it was sent to New York by F. Weinberg among a parcel of plants from Paraguay, and was then assumed to have come from that country. Its affinities, however, indicate that it is of Mexican origin, and the specific epithet is therefore somewhat unfortunate.

I am indebted to Mr. G. L. Wittrock of New York for the information that the epithet *Weinbergii* is invalid. Under the reference to Theodosia B. Shepherd cited above is the phrase " Weinbergii (New). Very handsome of bluish gray color, 25 cents and 50 cents." The plant is still in cultivation at Kew, where it flowers regularly in December and January. A. A. BULLOCK.

Hooker's Icones Plantarum.*—The first part of vol. 4 of the Fifth Series, published in December 1936, includes four double and twenty-one single plates illustrating plants of special interest which have been the subject of study by members of the Herbarium staff and visitors. It contains figures and detailed descriptions of five

* " Hooker's Icones Plantarum or figures with descriptive characters and remarks of new and rare plants selected from the Kew Herbarium." Fifth Series. Edited for the Bentham Trustees by Sir A. W. Hill, K.C.M.G., Sc.D., F.R.S., Director, Royal Botanic Gardens, Kew; Honorary Fellow, King's College, Cambridge. Vol. 4, Part 1 (London, Dulau & Co., 1936). Price 10*s.*

new genera and eleven new or recently published species, and descriptions of four additional (unfigured) new species.

Two double plates (tt. 3310, 3311) are devoted to *Macrozamia Douglasii*, a cycad endemic in Fraser Island off the coast of Queensland. As in all cycads, apogeotropic roots are developed at a very early stage, producing coral-like clusters at the surface of the soil, containing nitrogen-fixing bacteria. Figures are given showing the seedling still attached to the seed, the general habit of the plant, the leaf, and both male and female cones with detailed dissections.

There are 16 pages of text accompanying t. 3312, *Ectrosia leporina* (Australia, New Guinea), forming a complete revision of this genus of grasses. Similarly, under tt. 3313, 3314, *Thaumastochloa rariflora* and *Th. Brassii* (both from Queensland), there are an enumeration of the four species of the new genus *Thaumastochloa* and a key to the eight genera of *Rottboelliastrae* represented in Australia.

Apochiton Burttii (3319) and *Cymbosetaria sagittifolia* (t. 3320) represent new African genera of *Gramineae*, belonging to the tribes *Eragrosteae* and *Paniceae* respectively. Appended to the description of the former are a key to and enumeration of the 38 genera now included in the *Eragrosteae*.

Mr. G. B. Hinton's extensive collections in Mexico have supplied material for four of the plates. *Sickingia mexicana* (t. 3321) is not only a new species but a generic record for Mexico. *Rondeletia Jurgensenii* (t. 3322) was previously known only from rather poor material gathered nearly a hundred years ago by Jurgensen in the State of Oaxaca : it is now represented by ten different collectings in the District of Temascaltepec, State of Mexico. *Bouvardia cordifolia* (t. 3323), treated as a doubtful species by Standley (1926), and neither keyed nor described by him, was hitherto known only from an extremely brief diagnosis given by A. P. De Candolle in 1827, and from a tracing of a drawing in Sessé and Mociño's collection, which formed the basis of the diagnosis. It was collected in Temascaltepec towards the end of the eighteenth century by Sessé and Mociño, according to a specimen in the British Museum, and was rediscovered in that district in 1933 by Mr. Hinton. *Euphorbia fulva* (t. 3324) which was originally discovered in Jalisco by Pringle in 1902, has been re-described from the excellent material collected by Mr. Hinton in Temascaltepec. The male flowers are separated by curious paraphysal outgrowths which do not appear to have been noticed previously.

Combera paradoxa (t. 3325) is an extremely distinct new genus and species of *Solanaceae* discovered in the Neuquen district of Argentina by Mr. H. F. Comber. The plaited corollas when expanded present a circular appearance like that of a *Convolvulus*.

Studies on Indian *Araceae* by Prof. E. Barnes are represented by tt. 3305–7. A greatly amplified re-description of *Cryptocoryne consobrina* Schott (t. 3305) is supplied ; the leaves of this species are

now known to be dimorphic, the submerged ones being narrowly linear with strongly crispate-undulate margins, while the emergent ones are narrowly lanceolate and flat.

Priotropis inopinata (t. 3317), from Tanganyika Territory, affords an interesting example of discontinuous generic distribution, the only other species being *P. cytisoides* from the Eastern Himalayas, Burma and Siam, and *P. socotrana* from Socotra. *Burttdavya nyasica* is a new African genus of *Rubiaceae*, tribe *Naucleae*, forming a link between the genera *Sarcocephalus* and *Anthocephalus*.

The remaining plates represent the following plants :—*Jurinea taygetea* (t. 3301), *Amaracus scaber* (t. 3302), and *Teucrium aroanium* (t. 3303), all from Greece ; *Scrophularia laciniata* var. *macedonica* (t. 3304), from Bulgaria ; *Habenaria flabelliformis* (t. 3308), a recently described species discovered in Travancore by Prof. Barnes ; *Schima sericea* (t. 3309), a new species from Sarawak ; and two new species from the Solomon Islands, namely, *Bubbia haplopus* (t. 3315) and *Saurauia purgans* (t. 3316).

The Tropical Garden.*—In this book gardening in the tropics is considered from two main aspects, design and the choice of plants and their culture. The book is based on conditions prevailing in Hawaii but should be equally useful in many other parts of the tropics and subtropics.

The first six chapters are concerned with design and bear the following titles—The design of the tropical garden, Outdoor rooms for the tropics, Dry gardens and patios in the hot climate, Tropical water and rock gardens, Beach and mountain gardening, and Oriental influence in tropical gardens. The writers point out that the basic rules of garden design, harmony and balance, are the same the world over and that pronounced styles, such as the Italian, English, Spanish and Japanese are merely differences in the way these rules have been applied, due to different climates and plant materials. So far there is no such thing as a tropical style of gardening. In the authors' opinion " Such may develop in time based on the life of the people creating it." All too often gardens in the tropics are little other than copies of temperate gardens modified by the necessity of using different plants. The writers deplore this and hold that in the successful tropical garden wide spacing is to be avoided and success obtained by the massing together of subjects and the free use of large-leaved plants.

The listing and description of ornamental tropical plants occupies the greater part of the book, separate chapters being devoted to such groups as ferns, palms, large and small trees, shrubs, succulents, vines, annuals, orchids and lawns. Scientific and popular names are given to each plant described and the descriptions vary in length

*By L. E. Kuck and R. C. Tongg. The Macmillan Co., New York, 1936 Pp. xxiii + 378, plates 16. Obtainable from Macmillan & Co., Ltd., St. Martin's Street, London, W.C.2., price 12*s.* 6*d.* net.

according to the ornamental value of the plant in question. In a chapter entitled " Tropical fruits as ornamentals " the authors draw attention to the decorative value of such plants as the bread-fruit, sapodilla, carambola, several species of *Citrus* and the banana, particularly the red forms. They recommend the use of such plants even in gardens planned primarily for ornamental purposes, particularly where space is limited, for plants of this class naturally fulfil a dual function.

Several pages are devoted to the *Hibiscus*, perhaps the most popular of ornamental plants in the tropics. It is described as the " Official flower of the Territory of Hawaii," where its cultivation and the production of new forms by hybridization appear to attract special attention.

The final chapter contains a number of flower colour charts which should aid the tropical garden designer in providing variation in a garden which might otherwise tend to become monotonous. The colour categories adopted are purplish red, magenta and crimson ; red, scarlet and orange-red ; pink ; yellow ; orange and apricot ; blue, lavender and purple ; white and cream. The plants in these categories are sub-divided according to habit and the time of flowering of each species (under Hawaiian conditions) given separately. The book is illustrated by about four dozen well chosen photographs.

F. N. HOWES.

Hardy Californians.*—It is doubtful if a more ambiguous or controversial title could have been selected for this book on Californian plants. In her preface the authoress admits that hardiness is a " bugbear," but goes on to state that because of high altitudes, low temperatures, and a " constant more or less heavy blanket of snow " in which a plant grows " it surely must be able to survive severe winters anywhere." It must be borne in mind that the book is written, primarily, for American gardeners and conditions, but it is, nevertheless, a fact that while under a " blanket of snow," or even under dry and cold conditions, a plant may be perfectly hardy, the same plant may be proved *not hardy* under mild and damp climatic conditions.

The arrangement of the book is excellent. Commencing with the flora of the mountain tops, which the authoress terms the " Top of the World," she takes us down through the various floral zones, describing with considerable detail each plant association and, in the case of the larger genera, critically comparing and discussing, always with an eye to their decorative value, the various species. Chapters are devoted to the four large genera *Eriogonum*, *Penstemon*, *Lupinus* and *Viola*, and reading these alone makes one realise the mass of valuable material that has never been in cultivation. We can safely assume from the fact that some of those mentioned, e.g.,

* By Lester Rowntree. The Macmillan Company, New York, 1936. Pp. 255. Illustrated by 64 photographs taken by the authoress. Price 16*s*. net.

Lupinus Lyalli, *Penstemon heterophyllus* and *Viola pedata*, are in cultivation that many of the others described could successfully be grown in Great Britain.

Californian bulbs naturally have a chapter to themselves, and another is devoted to annuals. The latter deals with an interesting range of uncommon plants, including numerous annual species of well-known genera such as *Mimulus*, *Oenothera*, *Gilia*, *Phacelia*, etc. Although some of these species have been tried the majority have yet to make their debut in our gardens, and promise both interest and diversity in the annual borders of the future.

The authoress concludes with notes and comments on how to grow Californian plants, and gives practical advice on such diverse matters as selection, compost, sowing and transplanting.

The book throughout is written with an intimate knowledge of the plants, both in the field and under cultivation, and should be as interesting to the student of ecology as to the gardener, for whom, primarily, it has been written.

G. W. ROBINSON.

The Lily Year Book.*—The Lily Year Book of the Royal Horticultural Society for 1936 contains, in addition to articles of purely horticultural interest, several which are of importance to botanists. M. A. Tincker summarizes the results of scientifically controlled experiments carried out at Wisley on the propagation of lilies by scales; the best type of scale to employ, the position to be adopted (vertical or horizontal), depth to be planted, and also some preliminary tests as to temperature effects. The contractile roots of lilies—their structure, mechanics and function—have been re-investigated by F. Stoker. His account is presented in a light and non-technical style in order to stimulate the interest of the non-scientific reader. Amongst further items of botanical interest are a bibliography on the genus *Lilium*, consisting of some 550 references compiled by H. Souillet, and a note dealing in detail with the nomenclature of *L. Kelloggii* and *L. Bolanderi*, a case which affords an example of a peculiar type of difficulty but which may also arise in other groups. On the practical side a series of articles on lilies as grown in India, S. Africa, New Zealand and N. America indicates the interest of the volume to lily growers in all parts of the Empire.

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* Lily Year Book, No. 5, 1936. Royal Horticultural Society, London, 1936. Pp. 131, 38 figs. Price 5*s*. paper, 6*s*. cloth.

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